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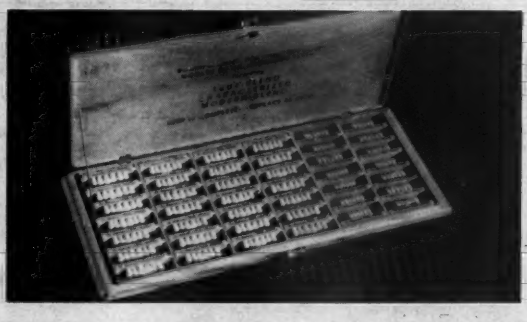

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THE Journal OF THE
AMERICAN DENTAL ASSOCIATION

DECEMBER 1, 1947 • VOLUME 35 • NUMBER 11

THE CHILD PATIENT AS A FUTURE PERIODONTAL PROBLEM

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THERE are in the recent dental literature a number of excellent papers[1-3] dealing with periodontal problems in the young patient. The large volume of literature dealing with diseases of the periodontal tissues in the adult is growing constantly. The purpose of this article is to discuss briefly some of the conditions encountered in the mouths of children which may, if not treated adequately and sufficiently early, lead to real periodontal problems during the adult period.

Diseases of the supporting structures of the teeth are responsible for the loss of more human teeth than is dental caries.[4, 5] During the recent national emergency the restoration of carious teeth in the members of the armed forces, by means of operative dental procedures, required the expenditure of tremendous time and effort. However, it was generally recognized that the replacement of missing teeth by means of prosthetic appliances constituted an even greater problem. According to Brauer,[6] "one man in five at the military age level has lost sufficient teeth or is required to lose teeth, which will necessitate wearing dentures."

It is reasonable to assume that, of the millions of teeth lost by these men, a majority of them were removed as a result of periodontal disease. Very often this condition was found to have had its inception at an age prior to the teens. The efforts of the dental profession in the field of public health dentistry ought to include a program of preventive periodontia, in conjunction with preventive orthodontics. If these phases of treatment received emphasis equal to that given to repairing the ravages of dental caries, the interests of our national health economy would be better served.

The following discussion takes into

Presented before the Section on Periodontia, eighty-eighth meeting of the American Dental Association, Boston, August 6, 1947.

Professor of dental histopathology, University of Washington, School of Dentistry.

1. Blackstone, C. H., A Clinical and Roentgenographic Study of Periodontic Problems in Children With Systemic Disease. *J.A.D.A.* 29:1664 (September 1) 1949.

2. Brauer, J. C., Periodontic Problems in the Child Patient. *J. Periodont.* 11:7 (January) 1940.

3. Brauer, J. C., Systemic and Local Factors in Periodontic Problems of the Child's Mouth. *J.A.D.A.* 30: 45 (January 1) 1943.

4. Massler, M., and Schour, I., *Atlas of the Mouth and Adjacent Parts in Health and Disease.* Chicago: American Dental Association, 1944

5. Brekhus, P. J., Report on a Statistical Investigation in the Loss of Human Teeth. *J.A.D.A.* 15:679 (April) 1928.

6. Brauer, J. C., Dental Physical Fitness. *J. Health & Phys. Educ.* 15:559 (December) 1944.

consideration a few examples of the general systemic diseases which may exhibit oral symptoms involving the teeth and their surrounding tissues. If these conditions are not treated, they may result in definite periodontal problems during the adult period.

The Endocrine Glands

The rather recent recognition of the extreme importance of the glands of internal secretion in many abnormal bodily states has led to the assumption of their importance in other conditions in which a causal relation cannot be shown. Schour and Massler[7] stated, "While recognizing the profound influences of the endocrines on the body economy and the dental apparatus, it must be pointed out that such conditions as nutrition and heredity are equally important." These authors said further, "The view that a large percentage of periodontal disease is a result of endocrine disorders is not yet justified." It is important that these statements be kept in mind by the dentist who is called on to make the diagnosis in a difficult case.

There are several endocrinopathies which have well known oral manifestations, and such manifestations are seen occasionally in the mouths of juvenile patients. Examples of such include diabetes mellitus, hypothyroidism and hypopituitarism.

Diabetes Mellitus

In untreated cases of this disease there is a lowered general resistance to infection, and a marginal gingivitis develops which usually progresses until the deeper tissues are involved and pus formation occurs.[8] The diagnosis in such cases is aided by the typical fruity odor of the breath. Excessive calcium is excreted in the saliva and urine of diabetic patients. This mineral is removed from the bones, including those of the jaws. The result is a loss of support for the teeth, which become loosened and shift from their normal positions.

Kent,[9] after examining the mouths of 5,000 diabetic patients, reported that in those patients less than 20 years of age heavy deposits of calculus accumulated rapidly on the lingual surfaces of the lower incisors and on the buccal surfaces of the upper molar teeth. Unless these deposits were removed frequently, periodontal disease occurred. This was also true in the older patients, and in many cases the resulting infection led to the loss of several or all teeth.

The degree to which diabetes in a child patient may affect the periodontal tissues in later years depends on the damage suffered by the dental apparatus prior to treatment. If bone loss has resulted in teeth drifting out of correct alinement, then malocclusion, food impaction and other abnormal conditions will develop, with a real periodontal problem resulting. Laxity in treatment will result in an exacerbation of the oral symptoms.

Figure 1, left, illustrates the typical appearance of the gingival tissues in diabetes mellitus. The gingivae are inflamed and edematous and bleed readily. The mandibular central incisors have drifted out of position as a result of the loss of more than half of their bony support. Further disturbances of occlusion could be expected if the patient were not brought under treatment. Typical calculous deposits are readily visible on the lower incisors.

Hypothyroidism

Comroe, Collins and Crane[10] stated

7. Schour, I., and Massler, M., Endocrines and Dentistry. *J.A.D.A.* 30:595 (April); 763 (May); 943 (June) 1943.

8. Rutledge, C. E., Oral and Roentgenographic Aspects of the Teeth and Jaws of Juvenile Diabetics. *J.A.D.A.* 27:1740 (November) 1940.

9. Kent, H. A., Dental Service for Diabetics. *N. Y. State J. Med.* 33:1083 (September 15) 1933.

10. Comroe, B. I.; Collins, L. H., and Crane, M. F., *Internal Medicine in Dental Practice*. Philadelphia: Lea & Febiger, 1942 (second edition).

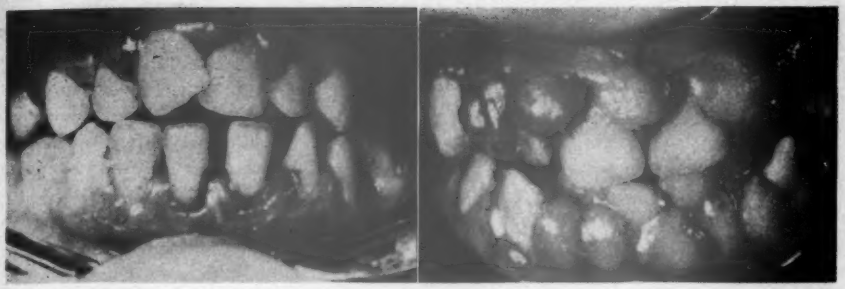

Fig. 1.—Left: Teeth of a 13 year old boy with untreated diabetes mellitus. The marginal gingivae are edematous and bleed readily. Loss of considerable alveolar bone has resulted in pathologic wandering of the teeth. Calculous deposits are visible on the mandibular incisors. (Courtesy Children's Hospital, University of Iowa, and J. C. Brauer.) Right: Gingival condition in an 11 year old boy with epilepsy. The hyperplastic gingivitis resulted from the use of 1½ grains Dilantin sodium four times daily for fifteen months. (Courtesy J. C. Brauer[3])

that patients with hypothyroidism constitute a large percentage of all persons consulting the orthodontist. The faulty jaw development results from malocclusion and faulty eruption of the teeth.

The thyroid gland, by regulating the metabolic rate, is extremely important in the maintenance of normal growth and development. A decrease in activity of the thyroid gland is reflected in the oral cavity by a retarded development of the jaws, a slower rate of tooth eruption and a delay in shedding of the primary teeth. In cretinism it is not uncommon to see a progressive deterioration of the teeth. This may lead to early loss of several teeth, most commonly the first molars.

Brauer[3] described an interesting case of hypothyroidism in which an extreme open bite became almost completely closed as the result of administering 1 grain of thyroid extract, four times a day, for a period of four months.

Abnormalities of alinement or occlusion which occur during childhood as a result of hypothyroidism are often responsible for periodontal as well as orthodontic problems in later life. Treatment of the underlying cause of the disease by means of thyroid extract has been spectacularly successful. Such treatment should be undertaken as early as possible, because the sooner treatment is begun the fewer will be the residual effects of the disease.

Hypopituitarism

There is often a delayed or faulty eruption and malalinement of the teeth associated with the stunted growth and retarded bony development which are typical of this condition. Rotated or malpositioned teeth allow food impaction, with gingivitis resulting from trauma to the soft tissues.

Scurvy

The oral tissues are often the first to exhibit signs of nutritional deficiencies. A deficiency of vitamin A, C or D affects chiefly the development of teeth and bones; whereas vitamin B deficiency is reflected primarily in the soft tissues of the oral cavity.[11] A few remarks concerning avitaminosis C may be of interest.

Scurvy, today, is an uncommon disease. Boyle, Bessey and Wolbach expressed the belief that vitamin C deficiency is the only nutritional disease which results in

11. Schour, I., and Massler, M., The Effects of Dietary Deficiencies Upon the Oral Structures. *J.A.D.A.* 32:714 (June); 871 (July); 1022 (August) and 1139 (September) 1945.

the production of typical periodontoclasia.[12] The bleeding which occurs is of a purpuric type and is the result of fragility of the capillaries. The periodontal fibers rupture easily and the tooth traumatizes the already weakened alveolar bone, causing its resorption.

Typical scurvy in children is usually seen only prior to the time when the child is placed on a generalized diet, which most often occurs by the age of 2 years. Cases of subclinical scurvy, however, exist in patients of all ages, and the differential diagnosis may be difficult. Campbell and Cook[13] developed the following therapeutic test for detecting avitaminosis C. No local treatment is instituted, but the patient receives 300 mg. of ascorbic acid daily for a period of five days. If a vitamin C deficiency exists, a rather dramatic improvement of the gingival condition occurs. If such improvement does not occur, the patient is not regarded as deficient in vitamin C.

Intensive local treatment alone in cases of scurvy will not result in complete cure of the gingivostomatitis. Until the blood level approaches the normal of 0.5 mg. per 100 cc. and remains there, a residual gingival infection will be present.[14]

Whether a low level of vitamin C in the blood results in the classical oral symptoms of scurvy or merely in a subclinical state of this disease will depend on several factors, including the degree of deficiency and the patient's ability to absorb and utilize the vitamin, once it has been ingested. Should the condition of avitaminosis C persist for a period of years, definite periodontal disease will develop, with loosening and drifting of teeth, malocclusion, food impaction and pocket formation.

12. Boyle, P. E.; Bessey, O. A., and Wolbach, S. B., Experimental Production of Diffuse Alveolar Bone Atrophy Type of Periodontal Disease by Diets Deficient in Ascorbic Acid (Vitamin C). *J.A.D.A.* 24:1768 (November) 1937.

13. Campbell, H. G., and Cook, R. P., Treatment of Gingivitis With Ascorbic Acid. *Brit. M. J.* 1:960 (March) 1941.

14. Roff, F. S., and Glazebrook, A. J., Therapeutic Application of Vitamin C in Peridental Disease. *J. Roy. Nav. M. Serv.* 25:340 (October) 1939.

Epilepsy

This is an abnormal state of the central nervous system, in which the patient loses consciousness periodically. Convulsions may occur while the person is unconscious. Although the symptoms have been recognized for hundreds of years, the essential disease process of epilepsy is still unknown.

The seizures which are typical of this disease may be controlled by the use of bromides, barbiturates or Dilantin sodium (diphenylhydantoin sodium). The disadvantage of employing sedation in the control of the attacks is that the patient may remain almost constantly in a much less alert condition than normal. In many cases treatment with Dilantin sodium results in marked fibrous hypertrophy of the gingivae. This may become so extensive as to necessitate surgical removal of the hypertrophic masses of tissue. Vigorous massage and scrupulous oral hygiene may prevent this proliferation or at least retard the process. It is important that the smallest effective dosage of Dilantin sodium be used, in order that the gingival hypertrophy be held to a minimum.

Figure 1, right, shows typical proliferation of the gingivae which was produced by the use of Dilantin sodium. It is evident that such a condition will require considerable attention from the periodontist and also from the oral surgeon.

Congenital Syphilis

Approximately three out of every four patients with congenital syphilis show dental stigmas related to the disease.[15] The tapered or notched permanent incisor teeth known as Hutchinson's teeth are seen in two thirds of the cases. More than one third of the patients exhibit enamel hypoplasia. The so-called mulberry molar is a common finding in chil-

15. Brauer, J. C., and Blackstone, C. H., Dental Aspects of Congenital Syphilis. *J.A.D.A.* 28:1633 (October) 1941.

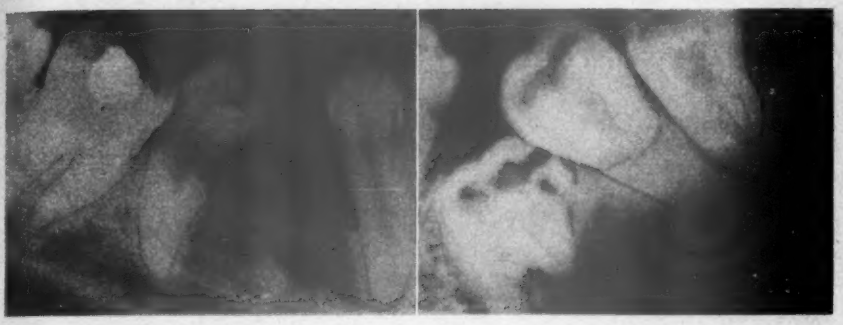

Fig. 2.—Left: Roentgenogram of the teeth of a man, aged 18 years, with congenital syphilis. A mulberry first molar was removed at the age of 8 years. The second bicuspid, which erupted into the position of the first molar, has rotated 90 degrees and has tilted mesially, creating a periodontal and a restorative problem. Right: Roentgenogram of the teeth of a man, aged 20 years, with congenital syphilis. The left mandibular permanent first molar is almost completely submerged and is carious. The second bicuspid and permanent second and third molars have shifted markedly out of normal alinement

dren suffering from this disease.

In congenital syphilis many of these abnormal permanent first molars are lost at a relatively early age, leading to a collapse of the arch and its usual periodontal and orthodontic implications. Figure 2, left, illustrates this situation. The lower permanent first molar, a hypoplastic tooth, was removed at the age of 8 years, and the second bicuspid shifted distally during development and erupted into the region of the first molar. The open space and the collapsed arch which resulted are readily visible.

Figure 2, right, illustrates an interesting condition encountered in the mouth of a patient with congenital syphilis. The almost totally submerged and carious mandibular permanent first molar has allowed the adjacent teeth to incline toward each other, above the crown of the submerged tooth. All the problems associated with food impaction, infection, pocket formation and malocclusion are present in such a case.

Antisyphilitic treatment may cause a definite hyperemia of the gingival tissues, especially in a patient who neglects oral hygiene. Figure 3 shows the gingivitis resulting from the injection of bismuth and mercury. The resulting pigmentation is evident in the margins of the inflamed gingivae.

Generalized Xanthomatosis

There are a number of uncommon systemic diseases of childhood which produce pathologic changes in the oral tissues. Generalized xanthomatosis (Schül-

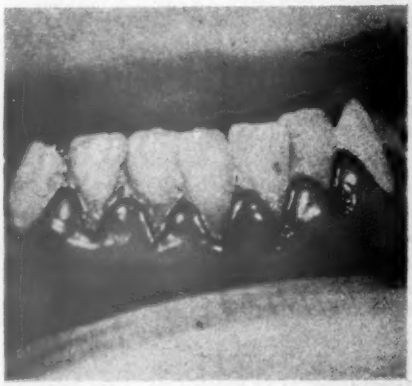

Fig. 3.—Gingivitis following a series of mercury and bismuth injections in a teen-age girl with congenital syphilis. The pigmented gingival margin is readily visible. (Courtesy Brauer and Blackstone[13])

ler-Christian disease) will serve as an example of such diseases and will illustrate the importance of inquiring into the early life of a patient for etiologic factors in periodontal disease.

This disease is chiefly a disturbance of cholesterol metabolism, with tumor-like tissue reactions around deposits of cholesterol in various situations.[16] The majority of cases occur before the age of 6 years, and approximately one third of them terminate fatally.

Gingivitis, with bleeding and tenderness, is a symptom of the disease. Although the primary teeth erupt at normal periods, the permanent first molars may erupt at the early age of 2 years[17] (before the roots have formed). If the teeth are not lost soon, they may shift around and a marked irregularity in alinement and occlusion may result.[18] Such conditions certainly pose real problems for the periodontist.

Diseases of the Blood

The most prominent oral symptoms of blood dyscrasias in children are associated with those entities which regularly lead to an early fatal termination.[19] For this reason there is little use in discussing this group of diseases from the standpoint of future periodontal involvement.

Gingivitis

Local factors also may lead to serious periodontal disease unless corrected during childhood. The dentist who carefully examines the mouth of every child patient will encounter a number of abnormal conditions which, singly or in combination with others, can be responsible for periodontal problems during the next decade or two.

Stowe[20] said that pyorrhea alveolaris is almost never encountered in children. Schour and Massler[21] stated that gingivitis is rare in a healthy child and when encountered may be a result of a systemic condition or in addition to local factors.

The inflammatory reaction which may accompany the eruption of a tooth through the gingival tissues is of a temporary nature and resolves itself soon after the crown of the tooth appears in the mouth.

As stated earlier, heavy accumulations of calculus are usually present on the teeth of patients with diabetes which is not under adequate control. There are, however, children in whom no systemic disease can be detected who have large masses of calculus on their teeth. Such a condition is usually associated with a distinct lack of oral hygiene and is accompanied by a definite gingivitis. This so-called filth gingivitis[21] requires thorough local treatment. If allowed to persist, it will lead to gingival recession and periodontoclasia in later years.

Figure 4, left, is a photograph of the maxillary teeth in a 5 year old girl. Although the general oral hygiene is good, calculus is present on the buccal surface of the primary second molar, and the gingival tissues adjacent to the calculus are inflamed.

A hyperplastic gingivitis develops in the mouths of some children. This is most common in mouth breathers and is usually limited to the labial gingivae of the anterior teeth, with the interdental papillae being especially involved. Treatment depends, naturally, on the cause of the mouth breathing, which is often a result of hypertrophied pharyngeal tonsils (adenoids). If the habit is associated

16. Austin, L. T., Xanthomatosis (Schüller-Christian's Disease): Report of Findings in One Case. *J. Oral Surg.* 4:209 (July) 1946.

17. Cohen, J. T., and Thomas, B. O. A., Oral Manifestations in a Typical Case of Schüller-Christian's Disease. *Minneapolis Dist. D. J.* 19:9 (September) 1936.

18. Griffith, J. P. C., Xanthoma Tuberosum, With Early Jaundice and Diabetes Insipidus. *Arch. Pediat.* 39:397 (May) 1922.

19. Thomas, B. O. A., Oral Manifestations of Diseases of the Blood. *University of Minnesota Med. School Digest* 2:91 (March) 1939.

20. Stowe, L. R., cited by Holt, L. E., and Howland, John, *Holt's Diseases of Infancy and Childhood.* New York: D. Appleton-Century Company, Inc., 1940, p. 357.

21. Schour, I., and Massler, M. cited by Brauer, J. C.; Higley, L. B.; Schour, I., and Massler, M., in *Dentistry for Children.* Philadelphia: Blakiston Company (second edition, in press), 1947.

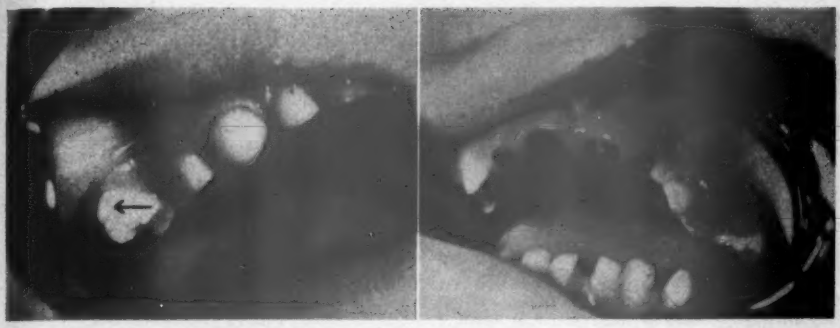

Fig. 4.—Left: Calculus near gingiva on buccal surface of maxillary primary second molar of a 5 year old girl. There is definite inflammation in the gingival tissues adjacent to the calculus. (Courtesy Children's Hospital, University of Iowa, and J. C. Brauer.) Right: Teeth of a 3 year old girl with rampant caries. The crowns of six teeth are almost completely destroyed. (Courtesy Children's Hospital, University of Iowa, and J. C. Brauer)

with a marked malocclusion, orthodontic correction is indicated. If the hyperplastic gingivitis persists into the adult period, a definite periodontal problem will exist.

Vincent's Infection

This disease is no respecter of children, and it is not uncommon to encounter the acute or subacute form of Vincent's gingivostomatitis in juvenile patients. If the subacute form persists for some time, the gingival margin is usually hypertrophied without ulceration or sloughing of tissue.[22] When acute exacerbations do occur, there are necrotic lesions of the interdental papillae and in the pericoronal tissues surrounding partially erupted teeth. Faulty restorations, heavy deposits of calculus and trauma incident to malpositioned teeth are among the factors which keep the gingival tissues in a state of lowered resistance. Every effort should be made to eliminate all such predisposing factors in order to preclude this constant threat to the health of the periodontium during the ensuing years.

Caries

Rampant caries may be responsible for the early loss of either primary or permanent teeth. Figure 4, right, illustrates a mouth in which the crowns of several primary teeth are completely destroyed. A marked gingivitis is present in the region of these broken down teeth. When the proximal surfaces of the teeth break down, food impaction may occur, with gingivitis and early formation of pockets resulting.

The early loss of the primary teeth often results in malpositioning of their permanent successors. Continued neglect of mouth hygiene will favor the development of caries in these latter teeth. Thus, with carious, malposed teeth in the mouth of a young adult, the factors necessary for the development of disease in the supporting structures of the teeth are present.

Figure 5 shows another source of infection of the alveolar bone and gingival soft tissues. This mandibular primary second molar has decayed so extensively that part of the crown has fractured away, and the pulp has lost its vitality. The resulting periapical infection has destroyed bone at the root ends and also in the bifurcation region of the involved tooth. Such an infection may present a periodontal problem of more than temporary significance. Further, the loss of this

22. Thoma, K. H., *Oral Pathology*. St. Louis: C. V. Mosby Company, 1944.

Fig. 5.—Roentgenogram of deeply carious mandibular primary second molar in child 5 years of age. Periapical and bifurcation involvement have resulted in considerable bone destruction and infection of the soft tissues. (Courtesy J. C. Brauer)

tooth when the child was only 5 years and 4 months old will allow the mesial movement of the permanent first molar. The condition shown in Figure 6 may result, and the periodontal problems accompanying such a malocclusion are well known to every dentist.

Trauma

Fractured teeth in children are not uncommon. The results of such accidents vary considerably in their severity and future implications. Figure 7 shows the result of fracturing the maxillary central incisors and one lateral incisor. The pulps in these teeth became necrotic and periapical abscesses resulted. A fistulous opening is evident on the labial tissues of one incisor, and the abscesses on the other two incisors are draining by way of the periodontal membrane and gingival sulcus. The extensive infection present in such a condition will require some time for its complete elimination. The involved periodontal tissues are far from normal.

Fig. 6.—Result of premature loss of mandibular primary second molar. The permanent first molar has shifted mesially and prevented the normal eruption of the second bicuspid tooth. (Courtesy J. C. Brauer)

Faulty Dentistry

A great many dental restorations, for one reason or another, leave much to be desired. A few of the examples of faulty dentistry are: open contacts; large excesses of filling material in the interproximal regions; proximal cement fillings which have dissolved, allowing the teeth to drift together; incorrectly designed clasps which impinge on the gingival tissues. The effects of such improper technical work on the individual tooth, the occlusion and the supporting structures of the teeth are important factors in the prognosis of the individual periodontal problem.

The important part played by fine restorative dentistry in the continued health of the periodontal tissues should be kept always in mind. Operations on the primary teeth should be carried out as painstakingly as are those on the permanent teeth. Poorly contoured restorations, with open contacts, invite food impaction and traumatic injury of the gingivae. Eventual formation of a definite pyorrhea pocket is the almost inevitable result of such a condition.

Habits

Abnormal forces applied to the teeth and jaws will, if continued for sufficient periods of time, result in movement of teeth out of their normal positions and will also cause changes in the contours of the facial structures. The results of such habitual practices as thumb or finger

sucking, lip or tongue biting and tongue thrusting produce very real problems in the field of preventive periodontia as well as in orthodontics.

Figure 8 shows the teeth of a 7 year old girl who has had a habit of sucking her lower lip since the age of 3 years. She practices the habit only when tired or during sleep. The failure of space to develop between the primary anterior teeth is evident on this photograph (compare with Fig. 4, left). Development of the anterior segment in both mandible and maxilla is less than normal, and all teeth are lingual to their normal positions. The permanent mandibular left central incisor has erupted in an abnormal alinement. There is not sufficient space for the other permanent incisors which should be erupting soon. Orthodontic treatment will certainly be essential in this case.

Figure 9 gives an idea of the type of irregularity which may be expected if treatment is not instituted in a case such as is described in the foregoing paragraph. The permanent mandibular lateral incisors are erupting into a lingual position. The immediate orthodontic problem is evident, and if the situation is not corrected, future periodontal difficulties are unavoidable.

These habits may create few harmful effects if abandoned sufficiently early. If they are continued into the period of transition from primary to permanent teeth, the resulting malocclusion and irregularity may present a real threat to the health of the periodontium.

Bruxism is a condition in which the patient unconsciously grinds the teeth together. Children practice the habit most vigorously during periods of nervous stress, when fatigued or during sleep. The excessive stresses placed on the resorbing roots of the primary teeth and the incompletely developed roots of the permanent teeth may result in serious damage to the periodontal tissues.

It is usually necessary to construct a removable occlusal splint to relieve the pressure on individual teeth. Such a splint, worn usually only at night, often suffices to break the habit within a relatively short period of time.

Fig. 7.—Teeth of an 8 year old girl who had fractured the two maxillary central incisors and the right lateral incisor four months previously. No treatment was instituted, and the pulps became necrotic, with periapical involvement resulting. A labial fistula is evident in the gingival tissue of one central incisor. The infection associated with the other two abscessed incisors is draining by way of the periodontal membrane and gingival sulcus. (Courtesy Children's Hospital, University of Iowa, and J. C. Brauer)

Often too much is taken for granted as regards the child's knowledge of the proper method of brushing his or her teeth. It is not uncommon to see in the mouths of young adults the results of

Fig. 8.—Teeth of a girl 7 years of age. During the past four years she has had the habit of sucking the lower lip, when tired or during sleep. The anterior segment of both jaws has failed to develop sufficiently to accommodate the erupting permanent incisors. The normal spacing of the primary teeth is absent

Fig. 9.—Lingual eruption of mandibular permanent lateral incisors in child 7 years of age. The primary lateral incisors are still in position. (Courtesy L. B. Higley, in Dentistry for Children by Brauer, Higley, Schour and Massler. Blakiston Co., 1947)

continuously incorrect brushing.[23] The vigorous use of a horizontal stroke of the brush injures the cervical tooth structures on the labial or buccal surfaces and causes recession of the gingival tissues. This recession, along with the gingivitis often resulting from improper or inadequate gingival massage, predisposes to more serious disease in the periodontal tissues.

Malocclusion

There are so many conditions which alter the normal relations of the teeth that this subject alone might well form the basis of the entire discussion.

Higley[24] said, "Although the ultimate goal is normal dentofacial relations in the adult, this can be achieved only by early elimination of etiologic factors and the establishment of normal function. Guiding the dentofacial structures to adult efficiency by preventive methods is more logical than attempting to correct the deformity after the damage is done."

This statement applies equally well to preventive periodontia. It is certainly wiser to prevent the development of those conditions which definitely predispose to pyorrhea alveolaris than to wait until deep curettage is required.

A few of the more common etiologic factors in abnormalities of the occlusion in children and young adults are discussed in the following paragraphs.

Premature Loss of Teeth. — Every dentist has seen the unfortunate consequences of the early loss of primary molars (Fig. 6). Mesial movement of the mandibular permanent first molar has resulted in loss of space, which prevents the eruption of the developing second bicuspid. The resulting abnormality in occlusal relations is well shown. Masticating efficiency, arch form, growth of the jaws and health of the local periodontal tissues are adversely affected by the premature loss of a single primary molar. The use of a suitable space maintainer would have avoided the necessity for orthodontic interference, which is now imperative.

The loss of the permanent first molars is responsible for more mutilated natural dentures than any other single factor. Once any of these "foundation stones" of the arch has been lost, a series of movements and altered relations of the teeth is initiated. All such changes carry definite periodontal as well as orthodontic implications.

Figure 2, left, illustrates a case in which the early loss of the permanent first molar has resulted in the eruption of the second bicuspid into the region previously occupied by the first molar. The second bicuspid is rotated 90 degrees and tilted mesially. The collapse of the arch in this region is evident, and the patient remarked that pieces of hard food

23. Hirschfeld, I., *The Toothbrush: Its Use and Abuse*. Brooklyn: Dental Items of Interest Publishing Company, 1939.

24. Higley, L. B., The Proper Time to Begin Orthodontic Treatment. *J.A.D.A.* 30:1529 (September 1) 1943.

wedged into that area and injured the gum tissue.

In Figure 2, right, the permanent first molar was not lost but remained submerged in the growing mandible. The periodontal problems in this instance were mentioned earlier, under congenital syphilis.

Delayed Loss.—Delayed loss of primary teeth and irregularities in eruption of permanent teeth should lead the dentist to investigate roentgenographically the abnormal retention of primary teeth as well as the failure of eruption of permanent teeth.

Figure 10, left, shows a retained primary cuspid with the root partially resorbed. The permanent cuspid and a small supernumerary tooth are unerupted. There is insufficient space for the permanent cuspid to erupt into position. Further, such movement is impeded by the dwarfed supernumerary tooth. The problem is surgical rather than periodontal. With the eventual loss of the primary cuspid, there will be the possibility of food impaction, gingivitis and pocket formation.

Figure 10, right, presents an unusual condition, in which the mandibular permanent first molar developed in a partially horizontal position and tilted mesially against the developing second bicuspid. The failure of this first molar to erupt has resulted in considerable disturbance of the occlusion. The developing second molar is also tilting mesially, and, although not visible here, the maxillary permanent first molar has erupted beyond the normal extent for a child of 10 years. The tissues surrounding this upper molar also have grown down with it, creating an asymmetrical maxillary occlusal curvature. Multiple periodontal problems may be anticipated here as a result of the failure of one tooth to erupt normally.

Multiple impactions, congenitally missing teeth, malformed or rotated teeth and other abnormalities of development and eruption are responsible for a number of difficult problems confronting the periodontist.

Summary

There are a number of systemic diseases which produce pathologic changes in the supporting tissues of the teeth. When these occur in children, the effects on the periodontal tissues are often responsible later for the development of pyorrhea alveolaris during the adult pe-

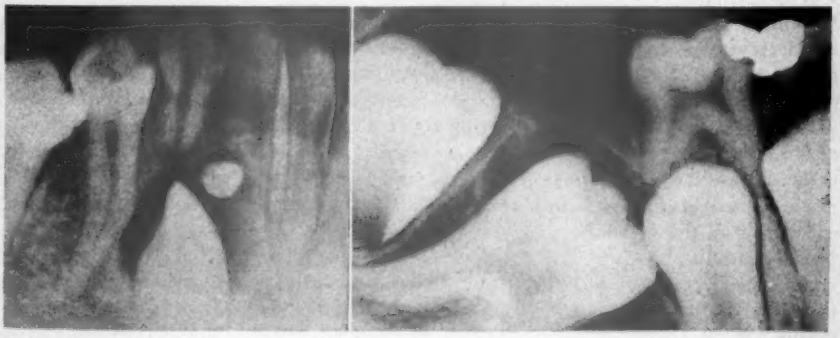

Fig. 10.—Left: Roentgenogram of retained mandibular primary cuspid in a man 20 years of age. The root is partially resorbed. Eruption of the permanent cuspid is impeded by insufficient space and the adjacent small supernumerary tooth. Right: Roentgenogram of malposed unerupted mandibular permanent first molar in a boy 10 years of age. The unerupted second bicuspid and permanent second molar are also definitely out of normal alinement

riod. Examples of such diseases are the endocrinopathies, vitamin deficiencies, epilepsy (oral disturbances are caused by specific treatment), congenital syphilis and a number of less common diseases, of which generalized xanthomatosis is an example.

Among the many local factors which are responsible for periodontal disturbances in the young patient are gingivitis, Vincent's infection, caries, trauma, faulty dentistry, habits and malocclusion.

Unless proper treatment is carried out, damage to the periodontal tissues will occur. Such damage may continue into the adult period to play an important part in the development of pyorrhea alveolaris.

Dentists should be alert to the possibility of correcting all abnormal conditions encountered in the mouths of children. Early elimination of these factors will prevent a great deal of future periodontal disease.

The interests of national dental health will be served better when preventive dentistry includes an active program of preventive periodontia.

IMPACTION OF PERMANENT FIRST MOLAR WITH RESORPTION AND SPACE LOSS IN REGION OF DECIDUOUS SECOND MOLAR

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Physiologic resorption of the roots of the deciduous teeth resulting in normal exfoliation is a process attending a definite time in their life history. All of the deciduous teeth have permanent successors in the normal dentition. As the permanent tooth moves occlusally in development it comes into close relationship with the supporting structures of its predecessor. This is thought to be the process by which resorption is initiated, and exfoliation of the deciduous crown is the final result. In this order the process of eruption of the teeth is worked out so carefully by nature that the course of events can be plotted chronologically.

Pathologic resorption in the deciduous teeth is that type which takes place prematurely. Delayed resorption resulting in retained teeth is not actually abnormal in so far as the process itself is not active. Premature resorption usually is initiated by infection from decayed or fractured teeth and adjacent tumors and cysts, but occasionally there is no known cause (idiopathic). Pressure resorption as seen in embedded or impacted permanent teeth is rare in the deciduous teeth because these teeth seldom remain unerupted.

The three permanent molars have no deciduous predecessors and are accommodated in the arches by development of bone in the posterior regions as the teeth form. Usually the deciduous second molar is in position with roots fully formed before the permanent first molar erupts,

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which occurs about the sixth year of life. Normally the latter assumes its position behind the deciduous second molar without initiating resorption, and the second molar is shed near the age of 11 years to be replaced by the second bicuspid.

A study of fourteen teeth from 9 of approximately 500 patients who visited the pedodontic clinic at the College of Dentistry in 1946 demonstrated that nature does not provide always for the uninterrupted appearance of the permanent first molar. In each of the instances considered the first molar was locked distal to the deciduous second molar. This caused premature or pathologic resorption of the roots of the adjacent deciduous tooth with loss of the tooth, in some cases, several months or years before normal exfoliation time. The consequences of associated space loss on the developing permanent teeth was the chief concern in treatment.

Sources of Information

A review of the dental literature revealed that this article apparently is the first in which there is detailed discussion of impaction of the permanent first molar with resorption of the roots of the adjacent deciduous molar, including suggested methods of prevention or treatment of space loss, and also age relationship. Several cases have been mentioned in the literature, but with the exceptions noted, the age of the patients and the course of events were not recorded.

Willett,[1] in 1933, in discussing premature loss of the deciduous teeth, said, "The distal roots of the second deciduous molar frequently absorb, permitting the first permanent molar to migrate forward, the usual result of which movement, if unchecked, is an impaction of the second premolar." McBride[2] described three impactions, two of which were in the maxilla, with a brief account of treatment by use of a separating wire at the contact points.

Lewis[3] studied the records of 6 cases, commenting briefly on two impactions in the maxilla and one in the mandible. Morgan[4] discussed an impaction in the mandible of an 8 year old child, thought to be caused by the bell-shaped crown of the deciduous second molar. McCall and Wald[5] and Salzmann[6] each mentioned 2 cases concerning the maxillae of 7 year old children. Brauer[7] showed a cast of the lower teeth of an older child and mentioned a method of treatment from the standpoint of preventive orthodontics. In all of the cases reported resorption took place at a late stage of eruption.

Fourteen Molars

The table presents a detailed account of fourteen deciduous molars showing premature or pathologic resorption as a result of impeded eruption of the permanent first molar. Forty roentgenograms were analyzed in compiling the data. It is obvious that some conditions were not diagnosed early enough for proper treatment. Also, other cases have not been followed for a sufficient length of time to report the final result. It is possible, however, by studying the material in composite order, to obtain an appreciation of what might happen in a typical case from initiation of resorption to the final outcome. It is worth while to know the individual reaction. Information relative to a typical case indicates which conditions might arise, but the

1. Willett, R. C., Premature Loss of Deciduous Teeth. *Angle Orthodont.* 3:106 (April) 1933.
2. McBride, W. C., *Juvenile Dentistry.* Ed. 4. Philadelphia: Lea & Febiger, 1945, p. 265.
3. Lewis, S. J., Ectopic Eruption of Permanent Teeth as a Factor in Premature Loss of Deciduous Teeth. *J.A.D.A.* 23:1019 (June) 1936.
4. Morgan, G. E., What Procedures Should Be Followed for Early Detection and Correction of Defects in Deciduous and Permanent Teeth? *J.A.D.A.* 26:378 (March) 1939.
5. McCall, J. O. and Wald, S. S., *Clinical Dental Roentgenology.* Philadelphia: W. B. Saunders Co., 1940, p. 155.
6. Salzmann, J. A., *Principles of Orthodontics.* Philadelphia: J. B. Lippincott Co., 1943, p. 217.
7. Brauer, J. C., Higley, L. E. and Boyd, J. D., *Dentistry for Children.* Philadelphia: P. Blakiston's Son & Co., 1939, p. 248.

Root resorption in deciduous second molars

Case	Tooth position	Date of roentgenogram	Age, mo.	Amount of resorption	Change in interseptal bone	Amount of space lost	Remarks	Treatment plan
1	Upper left	11-16-44	56	Taken before process started	None	None		Space preservation not a problem
		10-12-45	67	One-third distobuccal root, entire distal surface region	Slight loss	Very slight loss		
		5-15-46	73	One-half total root structure	Moderate loss	One-third width of deciduous molar		
		10- 9-46	79	All of root structure; part of crown	Considerable loss	Almost one-half width of deciduous molar	Extraction. Congenitally missing upper second bicuspid. Early loss of deciduous molars facilitated drift of first molars.	
		10-17-46	80		Further loss	One-half to three-fourths width of deciduous molar		
2	Upper right	11- 9-45	76	Two-thirds distobuccal root, apical portion	Considerable loss	Very slight loss		Space maintainer planned if tooth is lost soon and space begins to close
		10-15-46	87	Two-thirds distobuccal root, apical portion	Considerable loss	Slight gain	First molar erupted normally. Resorption seemed to stop. Observation for further resorption	
	Lower right	11- 9-45	76	Beginning distal root, near cervix	Considerable loss			Space maintainer planned if tooth is lost soon and space begins to close

		10–15–46	87	Two-thirds distal root, apex remaining as fragment	Considerable loss	Slight loss	Molar appears to be moving past resorption region. Observation for further resorption	
	Lower left	11– 9–45	76	Beginning distal root, near cervix	Considerable loss			Unless molar frees from lock, extraction and free end space maintainer planned
		10–15–46	87	Two-thirds distal root, from cervix spreading apically	Considerable loss	Slight loss	Molar appears locked in resorbed region. Observation for further resorption	
3	Upper right	10–22–46	108	Entire distobuccal and one-half lingual root	Considerable loss	None	First molar erupted normally. Observation for further resorption	Space maintainer planned if tooth is lost within a few months. No further treatment planned because of age
4	Upper right	10– 2–43	77	One-fourth distobuccal root, near cervix	Slight loss			Space maintainer planned if tooth is lost soon and space begins to close
		3–25–44	82	One-third distobuccal root, near cervix	Slight loss		Molar erupting normally	
		1–18–45	92	Two-thirds distobuccal root, near cervix	Slight gain		Molar near occlusion	
		9–26–45	100	Entire distobuccal root	Slight gain		Molar in occlusion, resorption seemed to stop	
		3–19–46	106	Entire distobuccal root	Stationary		Molar in occlusion	
		10–21–46	113	Entire distobuccal root	Stationary		Molar in occlusion. Observation for further resorption	
5	Upper right	11–14–45	70	Two-thirds distobuccal root, apical portion	Considerable loss	Slight loss		Waiting for permanent molar to assume erupted position. Extraction and double end abutment space maintainer planned

Root resorption in deciduous second molars (contd.)

Case	Tooth position	Date of roentgenogram	Age, mo.	Amount of resorption	Change in interseptal bone	Amount of space lost	Remarks	Treatment plan
5	Upper right, contd.	10- 5-46	81	Entire distobuccal root; apparently part of lingual root	Considerable loss	Slight gain	Permanent molar moving past resorbed region	
		10-29-46	82	Entire distobuccal and most of lingual root	Slight gain		Permanent molar still moving past resorbed region. Under observation	
6	Upper right	10- 5-42	79	Two-thirds distobuccal root, apical portion	Moderate loss	Slight loss		Tooth should have been extracted earlier because of continued lock and space loss
		11-12-43	92	Most of root substance	Considerable loss	One-half width of deciduous molar		
		1-15-44	94	All of root substance	Considerable loss	One-half width of deciduous molar	Extraction. Contact point wire placed without success	
		1-18-46	118			Two-thirds width of deciduous molar	Bicuspid erupting but crowded lingually	
7	Upper right	11-29-44	75	One-half distobuccal root, near cervix	Considerable loss	Slight loss		Free end space maintainer placed at proper time
		2- 7-46	90	Entire distobuccal root	Considerable loss	Slight loss	Extraction and space maintainer in place	
		11-23-46	99			Slight loss		
	Upper left	11-29-44	75	Two-thirds distobuccal root, near cervix	Considerable loss	Slight loss	Molar appears to be moving past obstruction	Space maintainer planned if tooth is lost soon and space begins to close
		2- 7-46	90	Entire distobuccal root	Slight gain	Slight gain	Molar in occlusion	
		11-23-46	99	Entire distobuccal root	Slight gain	Stationary	Molar in occlusion. Observation for further resorption	

							servation for further resorption	

8	Upper right	3-30-44	81	Two-thirds distobuccal root, near cervix	Considerable loss	One-third width of deciduous molar		Tooth should have been extracted at time of first roentgenogram because of definite lock, continued resorption and space loss
		1-29-46	103	Most of root substance	Considerable loss	One-third width of deciduous molar	Under observation. Tooth nearly shed	
	Upper left	1-29-46	103	Entire distobuccal and one-half mesiobuccal roots	Considerable loss	One-third width of deciduous molar	Under observation. Tooth nearly shed	Tooth should have been extracted earlier because of definite lock, continued resorption and space loss
9	Upper right	4- 6-45	88	Entire distobuccal and one-half of lingual root	Considerable loss	One-fourth width of deciduous molar	Molar appears locked in resorbed region	Tooth should have been extracted at time of, or previous to time of, first roentgenogram because of definite lock, continued resorption and space loss
		2-25-46	98	Entire distobuccal root, one half of lingual root and beginning resorption of crown	Considerable loss	One-fourth width of deciduous molar	Molar locked in resorbed region. Distal surface of crown erupted	
		12- 3-46	108	Further advance in all areas	Considerable loss	One-half width of deciduous molar	Teeth in same relation. Deciduous pulp infected. Extraction	
	Upper left	4- 6-45	88	Entire distobuccal root	Moderate loss	Slight loss	Molar appears to be moving past obstruction. Observation for further resorption	Space maintainer planned if tooth is lost within a few months. No further treatment planned because of age
		2-25-46	98	Entire distobuccal root and beginning resorption of crown	Slight gain	Slight gain	Molar in occlusion	
		12- 3-46	108	Further advance in all regions	Slight gain	Stationary	Molar in occlusion. Observation for further resorption	

individual patient should be treated according to the conditions which do arise.

Eight right upper molars and four left upper molars are included in the study. Two molars were in the lower arch.

The youngest patient (Case 1) was 67 months of age at the time the first evidence of pathologic resorption was noted. Unfortunately for purposes of this study, space preservation was not a problem in this case inasmuch as the upper second bicuspids were congenitally missing. Early extraction of the deciduous molars, which was the recommended treatment, merely facilitated mesial drift of the permanent first molars. In this case, however, there is a more complete history than in any other presented. The total process from beginning of eruption to loss of the tooth with continued impaction of the permanent first molar is included. From the time of the first roentgenogram at the age of 56 months (taken before the process had started) until the time of the next, at 67 months, when impaction was first detected, resorption had progressed to involve approximately a third of the distobuccal root. From this it can be assumed that resorption must have started soon after the first roentgenogram was made. As indicated, complete destruction occupied a period of approximately two years.

By comparison, the record in Case 6 covers a period of 15 months, but considerably more resorption occurred before the condition was detected. Fifteen months is the time interval during which resorption occurred in Case 7 (upper right molar) with a similarly deficient history. Case 8 (upper right molar) covers 22 months with the tooth nearly ready to exfoliate at the time of the last roentgenogram.

From these data it is possible to predict that in most instances resorption, from the time of its inception until the tooth is shed, probably covers a period of slightly less than two years. During the two year period the permanent tooth is prevented from assuming its full occlusal contact.

Cases 6, 8 (upper right and upper left molars) and 9 (upper right molar), described in the table, illustrate the course of events when the deciduous tooth is rapidly resorbed at an early age, with continued lock, without a space maintainer being placed. Marked space loss had occurred. The upper right molar of Case 9 is shown in Figure 1, left. In Case 7 (upper right molar), in which the background is similar, a space maintainer was constructed at the proper time. In Case 2 (lower left molar) similar treatment is planned unless there is a change in the

Fig. 1.—Left (Case 9, upper right molar): Locked permanent upper molar in the first stage of eruption (late third stage impaction). Note the extrusion of the deciduous second molar beyond the line of occlusion. Right: Results of early loss of deciduous lower second molar and space in the bicuspid region

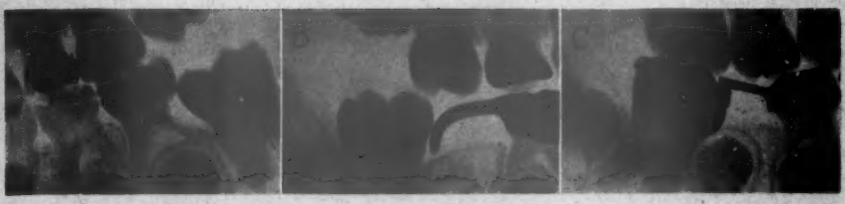

Fig. 2.—A, roentgenogram showing severance of deciduous root tip (X) from remainder of tooth during Stage III resorption; B, free end space maintainer of the anterior double abutment type with a guide spur for use in cases of unerupted permanent first molars; C, double end abutment space maintainer used in cases in which the permanent first molar has gained full occlusal contact

course of events. Otherwise closure of the space and permanent impaction of the second bicuspid can be expected (Fig. 1, right).

Space Maintainers

It is not necessary to place a space maintainer if the permanent molar erupts and the deciduous tooth can be held in position until the eruption time of the second bicuspid or if the space does not close too much after loss, based on measurements compared with average widths of bicuspids. The physiologic age of the child's teeth has considerable bearing on this decision. In older children the space usually does not close as rapidly as in younger children. Also, early loss of the deciduous molar often hastens eruption of the second bicuspid, even though it may have little or no root development at the time. If the permanent molar is in an erupted position and locked in occlusion and the difference between the child's dental age and expected eruption time of the second bicuspid is not greater than six to nine months, the chances are that a space maintainer is not indicated. This is exemplified by Cases 3, 4, 7 (upper left molar) and 9 (upper left molar).

The data in the table show a good correlation between the amount of resorption and the change in interseptal bone. Usually there is space loss with resorption and disappearance of interseptal bone, although the governing factor regarding space is the presence of the deciduous molar, whether or not the permanent molar is freed from the lock. Occasionally there is space gained, as in Cases 2 (upper right molar), 5, 7 (upper left molar) and 9 (upper left molar). In other words, one occasionally sees resorption and bone loss without ultimate space loss, but the reverse is never true. In cases of temporary impaction, pressure from the first molar seems to initiate resorption, with the tooth soon moving on to take its proper position in the arch. The process of resorption seldom stops once it has begun nor is there appreciable evidence of regeneration if the bone tissue is involved.

Cases 1, 2 (upper right molar), 5 and 6 demonstrate resorption which apparently started in the apical portion of the root. In Cases 2 (lower right and lower

Fig. 3. (Stage I).—Beginning radiolucency at cervical region of lower molar

left molars), 4, 7 (upper right and upper left molars) and 8 (upper right molar) resorption started in the cervical region, but in Cases 3, 8 (upper left molar) and 9 (upper right and upper left molars) it is of questionable origin. If the process has destroyed the greater part of the root, it is difficult to determine accurately the site of origin.

Diagnosis and Treatment

From the cases studied it is apparent that resorption starting at the cervix can cause an additional complication by cutting off a portion of the apical extremity of the root, leaving it embedded in the alveolus (Fig. 2, A). Undoubtedly, this accounts for some of the root end fragments of deciduous teeth occasionally observed in roentgenograms of adults.[8]

In most of the cases described in this report, space loss in the region of the bicuspids, caused by mesial drift of the permanent first molar, is serious because of the early age at which this can occur. If space loss is allowed to develop uninterruptedly, the complications which result offer orthodontic problems which are difficult to solve. In general, if the permanent molar has not erupted and appears to be hopelessly locked, the deciduous second molar should be extracted, and such an appliance as Willett[9] uses should be placed to guide the molar into position (Fig. 2, B). On the other hand, if the molar is partially erupted, an appliance that effects distal movement of the offending permanent molar should be placed. Lewis[3] advocated either banding the tooth and using an intermaxillary extension or a modified jackscrew arrangement that not only moves the molar distally but tips it as well.

If the permanent molar shows promise of erupting, provided frequent roentgenograms are made and space closure is not too advanced, extraction and use of a space maintainer can be delayed. This should be practiced in cases of children of advanced physiologic dental age in whom the time of eruption is near. Sometimes some space loss may occur without complications. The bicuspids occupy less space mesiodistally than the deciduous molars and the permanent first molar shifts forward to close the surplus space. Black[10] calculated that the combined width of the upper and lower bicuspids averages 14 mm.; that of the deciduous upper molars, 15.5, and that of the deciduous lower molars, 17.6. This allows for a possible average drift of 1.5 and 3.6 mm., respectively, without ultimate crowding.

Infrequently, regardless of age, there is space maintenance as a result of occlusal locks or natural growth impulses associated with the unerupted bicuspid after premature loss of the deciduous molar. If the tooth is allowed to remain, care must be exercised to prevent infection of the pulp and supporting tissues under the crown. Infection occurred in Case 9 (upper right molar) shortly after the last roentgenogram was taken, and it was necessary to extract the tooth. McCall and Wald[5] called attention to this complication. If a tooth is pushed out of position or is extracted at an earlier age, however, and the permanent molar gains full occlusal contact, the best policy is to place a space maintainer of the double end abutment type (Fig. 2, C).

Progressive Root Resorption

The characteristics associated with premature root resorption in deciduous molars can be classified roughly into five stages on the basis of progressive destruction (Figs. 3-7). These stages, with suggested methods of treatment, are as follows:

8. Kronfeld, R., *Histopathology of the Teeth*. Philadelphia: Lea & Febiger, 1939, p. 270.

9. Willett, R. C., Interception of Malocclusion. *D. Digest* 56:304 (May) 1950.

10. Black, G. V., *Descriptive Anatomy of the Human Teeth*. Ed. 4. Philadelphia: The S. S. White Dental Mfg. Co., 1902, p. 14.

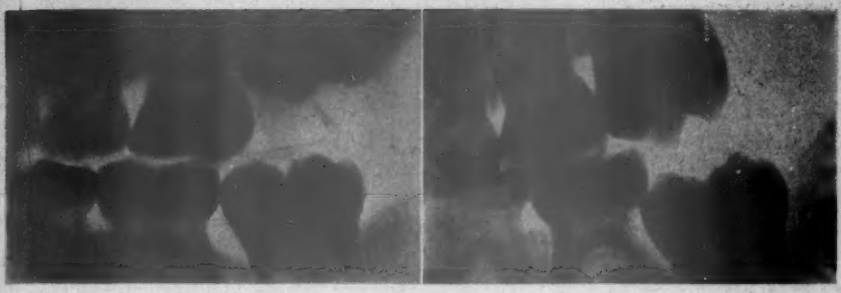

Fig. 4 (Stage II).—Left: Early resorption in the maxilla with permanent molar beginning to slip by the lock. Right: Lower first molar in a fixed position with resorption more advanced

Stage I

Characteristics.—The first evidence of pathologic resorption of the roots of the deciduous second molar is a small shadow or radiolucent area in the cervical or apical[11] region on roentgenographic examination. Here, the marginal ridge portion of the mesial surface of the permanent first molar is lodged in the vicinity of the region of resorption. The interseptal bony crest shows slight or moderate compression and narrowing. As a rule, there is no appreciable loss of space.

Treatment.—Usually no treatment can be carried out during this early stage. This is the time for diagnosis and subsequent checking by means of roentgenograms.

Stage II

Characteristics.—Resorption is definite in Stage II and progresses rapidly in most cases. There is approximately a third loss of the distobuccal root of the deciduous upper second molar or distal root of the lower molar on the distal aspects, proceeding in a regular manner from the apical region. If the resorption has started in the cervical region, a corresponding amount of cervical root portion is lost. At this time the permanent first molar is lodged in the concavity of the resorbed region or is showing indications of slipping by the lock. The bony crest shows further depression. There is beginning loss of space. Resorptive changes may come to a standstill, but in most instances they remain active.

Treatment.—Roentgenograms must be made frequently, and unless the tooth frees from the locked position, eventual extraction and placement of a free end space maintainer with a spur to engage the mesial surface of the erupting permanent molar must be considered before too much space is lost. An orthodontic wire or a fixed space maintainer with anterior and posterior abutments cannot be placed because of the unerupted position of the permanent molar.

Stage III

Characteristics.—Nearly all root structure is lost in Stage III. The process involves especially the distobuccal root and possibly the lingual root of the upper molar and nearly all of the distal root of the lower molar. The mesiobuccal root of the upper molar may remain intact. If the permanent tooth is still in the unerupted position, there will be further space loss. In other instances, space might be gained by freeing of the tooth from the locked position, in which event the first visual indication of eruption is present. In cases of progressive resorption, bone loss is definite, oftentimes with com-

11. Roentgenograms in this collection do not show beginning resorption in the apical region, but other evidence presented indicates that where destruction has involved a portion of the root in this region, resorption probably started nearer the apex.

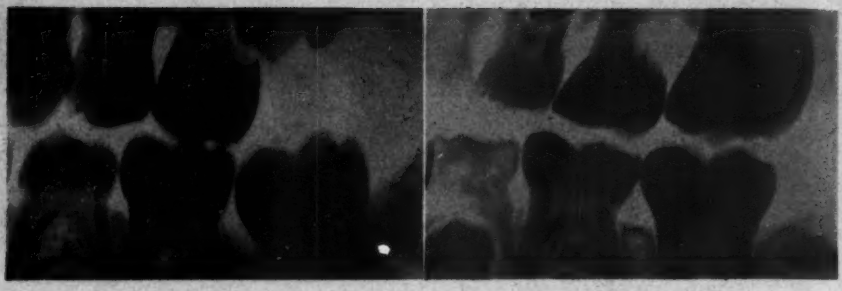

Fig. 5 (Stage III).—Left: Upper first molar in a locked position with marked root and space loss. Right: Molar has slipped by the lock and is in full occlusal contact

plete loss of the interseptal crest. If there is continued impaction of the permanent molar, there is loosening and beginning of exfoliation of the deciduous tooth.

Treatment.—In young persons in whom the permanent molar remains impacted, the treatment is extraction of the deciduous tooth with placement of a free end maintainer. In this instance, the tooth seldom passes the lock. If the permanent tooth in older patients shows promise of gaining occlusion, frequent roentgenographic re-examinations must be made for continued resorption of the deciduous roots, or if the tooth is lost, space checking must be done in order to prevent closure with subsequent crowding of the erupting bicuspid.

Stage IV

Characteristics.—If the deciduous tooth remains but is loosened from its attachments, there is usually progressive resorption, sometimes to the extent of involving crown dentin and enamel. If the permanent tooth remains in an unerupted position, space loss of as much as half of the diameter of the deciduous molar is common. There is both tipping and movement of the permanent first molar. Such a stable lock prevents the permanent tooth from assuming its full occlusal contact without removal of the interference. There is no evidence of interproximal bone in this stage.

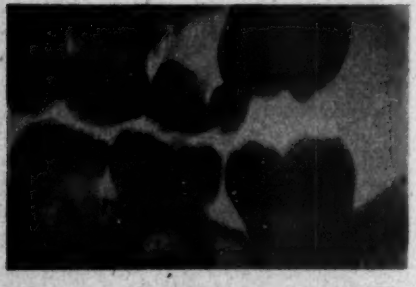

Fig. 6 (Stage IV).—Complete loss of all root structure

Treatment.—Resorption should never be allowed to progress until this amount of damage has taken place. If it does occur, however, more complex orthodontic treatment than is outlined in this report is indicated. Immediate and temporary treatment is extraction and placement of a free end maintainer to hold the remaining space.

In cases in which the permanent tooth has slipped by the lock at an earlier stage but destruction has continued, the deciduous tooth must be extracted and a double end space maintainer constructed to hold the space until the second bicuspid erupts. In older children the space must be carefully measured until the permanent successor appears.

Stage V

Characteristics.—If the process of resorption with exfoliation continues, the per-

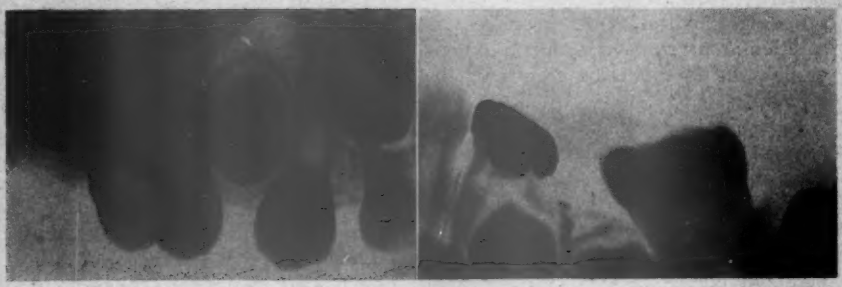

Fig. 7 (Stage V).—Space loss and impaction of the second bicuspid in the maxilla and mandible, respectively, as a result of premature exfoliation of the deciduous second molar

manent first molar drifts and tips mesially into the region formerly occupied by the deciduous second molar. This is especially true if loss of the tooth occurs at an early age.

Treatment.—Complicated cases of space closure incidental to early loss of the deciduous second molar offer a major orthodontic problem, namely, moving the permanent first molar into a more distal position. Unless this is done, the underlying bicuspid, which normally erupts later, probably will be impacted or crowded into a lingual or buccal position during eruption.

Discussion

A study of cases such as those described should give a deeper insight into some of the predisposing causes of malocclusion. Interpreted in terms of patterns of accelerated or retarded physical growth, the observed phenomena of impaction and resorption assume an added significance. The series of events which were observed cannot be attributed to an exaggerated convexity of the distal surface of the crown of the deciduous molar, as mentioned by Morgan,[4] or a contact point affair, as postulated by McBride.[2] The evidence against this is that resorption always begins at the cervical or apical regions of the root where the mesial aspect of the permanent first molar exerts pressure.

This pressure, emanating from compression of the tooth capsule, may in turn compress other tissues, including the periodontal membrane, all of which would cause stimulation and cellular response. None of our roentgenograms shows the enamel of the two teeth in contact at this time. Moreover, the convexity of the crown surfaces is a normal anatomic feature of all deciduous teeth. The more important factors operative in causing lodgment of the permanent first molar, therefore, are thought to be a combination of the force of physiologic mesial drift of the permanent first molar acting with the eruption impulse. Misdirection occurs as a result of lack of bony growth in the angle or tuberosity region at the correct time. Such growth normally accommodates the development and positioning of the crown and the roots.

Active growth in width and depth of the face precedes eruption.[12] Normally there is considerable anteroposterior growth of the jaws between the time of completion of deciduous dentition and eruption of the permanent first molars. When impaction of the molar occurs, there probably is a lag in the systemic factors which control the development associated with increase in depth of the face. The principal governing factor in

12. Hellman, M., Changes in the Human Face Brought About by Development. *Internat J. Orthodontia* 13:475 (June) 1927.

initiating the process of pathologic resorption occurs in the retardation of bony growth in the posterior region of the alveoli.

Impactions occur in the maxilla much more frequently than in the mandible. This may be due to the fact that there is greater potential forward movement of the permanent molars in the upper jaw. Also, since it is known that growth in depth of the face takes place at a greater speed in the mandible than in the maxilla, retardation of bone expansion is likely to be more pronounced at a given time in the maxilla, although it is possible for the two regions to be affected simultaneously (Case 2).

Salzmann[6] stated (p. 140) that the so-called backward growth of the maxilla normally furnishes sufficient bony support for the three molar teeth. He also said (p. 145):

> There is a growth area in the mandible along the junction between the body and ramus. The ramus apparently becomes resorbed on its internal angle, allowing more room for teeth, and added bone growth takes place on the external border of the ramus, making the mandible longer. The alternating influences of increase in size and adjustment of parts occurring in this area allow additional room for the molar teeth to erupt and control the axial inclination of the last developing molars as they move from this site of origin in the rami of the mandible where they eventually erupt into the mouth.

If bony growth does not occur during or preceding the eruptive phases of the tooth, the forces are directed mesially causing the crown of the permanent tooth to butt against the roots of the deciduous second molar. There may be ample growth of the maxilla and mandible distally at a later date, but the misdirected forces incident to the drift in its path of eruption earlier may be of such intensity that locking is continued. This is especially true if the concavity of resorption is large. If this occurs the result is the same, namely, premature loss of the deciduous tooth, a further shifting of the first molar, with the second bicuspid eventually erupting out of line. The course is then opened for complicated malocclusion influenced by the simple mesial movement of the permanent first molar. On the other hand, if the mesial drift force is of such low intensity that pressure can be relieved by bony growth the tooth can pass the region of obstruction and assume its proper position in the arch.

Summary

The data concerning fourteen permanent first molars impacted distal to the deciduous second molar, with resulting root resorption and space loss in several instances, are presented in a table. The frequency with which resorption was detected after the first case was diagnosed indicates that this condition is more common than might be suspected. The data presented show that it occurs in approximately 1 out of 50 persons.

The cases studied were sufficiently different to demonstrate that each patient should be handled more or less individually. It is difficult to formulate general rules when dealing with such variables as age, eruptive forces and stimulus to bony growth. Nevertheless, it is possible to state that in young persons, if the process of resorption and space loss goes on uninterruptedly, the condition should be watched carefully, the deciduous second molar extracted early and a space maintainer placed. Otherwise, the second bicuspid may become impacted or crowded into an abnormal position, or other complications may arise. If it is possible to intercept the progress of such contributing causes of malocclusion in this manner, a long step has been taken in the reduction of complex abnormalities to simpler ones. In older persons, however, if the deciduous molar has been preserved or has remained free from infection, and the permanent molar has

gained full occlusion, a space maintainer may be avoided if the condition is observed closely.

The accidental finding of deciduous root tips in 1 case, severed and retained as a result of cervical pressure resorption from an unerupted first permanent molar, suggests the possibility that this process may account for many of the root tips reported found in adult mouths in the region of the roots of erupted second bicuspids.

SELECTION OF TOOTH COLOR FOR THE EDENTULOUS PATIENT

E. Bruce Clark, D.D.S., Pittsburgh

Full denture service presents a color problem in the selection of teeth that is different from the color problem in other fields of restorative dentistry. Full denture service demands color selection, and partial dentures, crowns, inlays and bridges require only color matching. Matching color is comparatively simple because the color requirement is known. The selection of a color for the edentulous patient is more difficult because the natural teeth are no longer present to act as a guide. Therefore other data, information and characteristics of the patient must be depended on as guides. These factors plus an understanding of some of the fundamentals of color will enable the dentist to make a satisfactory selection.

The fundamentals of color are, unfortunately, not common knowledge since color science was not a part of early dental education. Therefore, let us review the attributes of color and the terms that are necessary for its description.

A color cannot be described or recorded without reference to its attributes or dimensions. Color has three dimensions: hue, brilliance and saturation.[1] Hue is the dimension that relates the color to the spectrum. In other words, the term "hue" describes the color as reddish, yellowish, greenish or bluish. The second dimension, brilliance, classifies color in respect to its lightness or darkness. Saturation, the third dimension, specifies the strength of the hue in the color.

Hue

The attribute of hue, the first dimension in color, is becoming of less and less concern in dentistry as time and experience have improved the shade guides. My first ceramic shade guide, constructed twenty-two years ago, included five hue steps, all of which I thought were necessary because the commercial shade guides of that time exhibited greenish yellow hues. I later learned that these hues were far beyond the limits of tooth color.

My second shade guide, known as the tooth color indicator, had three hue steps. This guide permitted the use of only one slightly greener yellow or one slightly redder yellow step if the hue of the shade guide tooth itself did not exactly match the case. After fifteen years of practical application, I find that the two extra hue steps are hardly necessary. In approximately 800 patients for whom jacket crowns or facings were made, the

Read at the eighty-second annual meeting of the Chicago Dental Society, February 10-13, 1947.

1. Clark, E. B., The Color Problem in Dentistry. *D. Digest* 37:400 (August) 1931.

greenish yellow hue was used in only 1.1 per cent and the reddish yellow hue in only 4.3 per cent of the cases.

I mention these figures to emphasize that, in selection of teeth for the edentulous patient, hue is unimportant and the dentist's entire attention can, therefore, be given to the two remaining dimensions —brilliance and saturation—without the confusion that results from the presence of a third factor.[2]

Brilliance

The second dimension of color is a most important one in the selection of artificial teeth. Every color in nature contains certain amounts of black and white. The more white the color contains, the more brilliant it appears. The more black it contains, the less brilliant it appears. This property of whiteness and blackness or lightness and darkness is the dimension of color known as brilliance.

It is this dimension of color that changes in natural teeth with advancing age, a phenomenon that is familiar to everyone. Young persons have light teeth and old persons have dark teeth, the rate of change being fairly constant throughout life. Color differences in this dimension are recognized more easily by the average person than are differences in the other dimensions. It is probably because most persons are familiar with the dimension of brilliance that shade guides always have been arranged in progressive steps from light to dark, some having a great many steps and others only a few. The number of steps necessary has been a debatable question. It is generally conceded that fewer steps are required for edentulous patients than for any other type of color matching.

I had an opportunity, several years ago, to make some experiments that seem to verify my opinion that six brilliance steps were the least number necessary to meet the needs on a shade guide for edentulous patients. Approximately 5,000 extracted anterior teeth were collected from exodontists and from large clinics and other institutions in all parts of the United States and Canada. After extraction the teeth were placed immediately in a suitable solution provided for preserving their natural color. On receipt, the teeth were cleaned and polished, all decay removed and the cavities filled with silicate cement. Devitalized and badly broken down teeth were discarded. Finally, 2,548 specimens were obtained.

These teeth were classified into five major groups from light to dark. About half of the fifth or darkest group were heavily stained and, although they maintained the characteristics of the fifth group, the stains made them somewhat darker.

On completion of the classification, it seemed that too few groups had been used, for the steps appeared to me rather widely separated. In order to check further, I secured the services of seven college students to reclassify the upper central incisors. The students were instructed to group the teeth in easily perceptible steps of brilliance from light to dark and to discard those teeth in which saturation confused their judgment. Three of the students grouped the teeth in five groups, three in six groups and one in seven groups. After this work, I was satisfied to accept the original classification of five major brilliance groups and the one extra dark group produced in the fifth group by stain.

Since teeth darken with advancing age, another interesting and helpful fact obtained from this classification of natural teeth according to brilliance groups concerned the age at which most anterior teeth are lost. The table indicates that the upper central and lateral incisors, the lower incisors and all cuspids are lost at almost the same rate, but the rate increases to the third brilliance group and then decreases to the fifth group. In

2. Clark, E. B., Tooth Color Selection. *J.A.D.A.* 20:1065 (June) 1933.

Classification of natural teeth and shade guide teeth into five brilliance groups, showing the percentage of occurrence for each group

Teeth	Brilliance steps				
	I	II	III	IV	V
918 upper central incisors	8.4	21.1	42.0	19.3	9.2
387 upper lateral incisors	9.1	20.2	41.6	21.1	8.0
800 cuspids	8.8	19.2	38.1	22.8	11.1
443 lower incisors	4.8	22.3	42.9	17.1	12.9
2,548 natural teeth	7.7	20.7	41.1	20.1	10.3
776 jackets and facings	8.6	22.9	42.1	18.9	7.5

round numbers, 10 per cent of all anterior teeth extracted fall in the first group, 20 per cent in the second group, 40 in the third, 20 in the fourth and 10 in the fifth, which includes the sixth group or dark stained teeth.

Since the tooth color indicator (Fig. 1) has ten steps in brilliance, it is a simple matter to reduce the ten steps to five to establish a comparison with the five groups of natural teeth.[2] The table shows that replacements requiring jackets or facings occur at a rate almost identical to the rate of extraction of natural teeth. This finding is logical because a jacket crown is usually placed as a last resort, if the patient does not wish to have the teeth extracted and replaced by other methods. In both instances, the same percentage of the total number are having some sort of restoration at the same period of life. In other words, either the grouping of the natural teeth or the grouping of the shade teeth on the tooth color indicator can be used to represent the color changes that take place in the dimensions of brilliance during a lifetime. Both show the lightest teeth replaced, the darkest teeth replaced and the various intermediate groups.

Complete records have been kept of 776 patients who received jackets or facings from shades taken from the tooth color indicator. In addition to other information, the records noted the ages of these patients. Therefore, these records can be used to show the age range of each group of patients when classified into five groups as well as the age range of the persons whose extracted natural teeth have been classified into five groups. An average of the ages appearing in each group was taken and found to be 17 years for the first group, 26 for the second, 38 for the third, 52 for the fourth, 64 for the fifth and 72 for the last group. It is interesting to note how uniformly and progressively the teeth darken with advancing age.

The records can be used further to establish age limits for each group of teeth, thus giving the first clue to the proper color for the edentulous patient. If the age limits of each group are taken

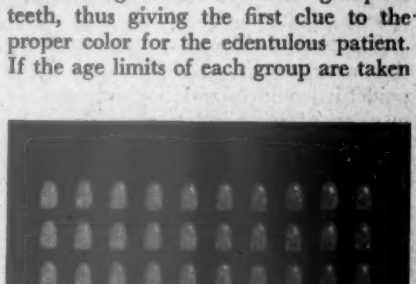

Fig. 1.—Tooth color indicator. Colors are arranged from left to right in ten brilliance steps, and in six saturation steps in the vertical rows

in round numbers, it can be conveniently and fairly accurately specified that a tooth from the first group will accommodate patients 20 years of age or less. The second group should be used for patients 20 to 30 years of age; the third group for patients 30 to 45; the fourth for patients 45 to 60; the fifth for patients 60 to 70, and the last group for patients 70 and above. The color for the last group and often for the fifth group may in many cases require considerable staining.

There is, of course, a rather wide variation of ages for each brilliance group in the tooth color indicator, but it has been noted that extreme age differences from the average are the exception and not the rule. A considerable range of ages is also required when only six brilliance steps are used. Therefore, when selecting teeth for an edentulous patient, the dentist occasionally will find a patient whose color requirements fall into either a lighter or darker group than his age would indicate. Conditions other than age govern these exceptional cases. They will be considered later in their proper order.

If a plan of this nature were used for the arrangement of teeth on a shade guide, it would provide for only one dimension of tooth color, since the units would be arranged from light to dark in only six brilliance steps. These six units would not be sufficient for a complete shade guide since no provision has been made for the third dimension of color: saturation.

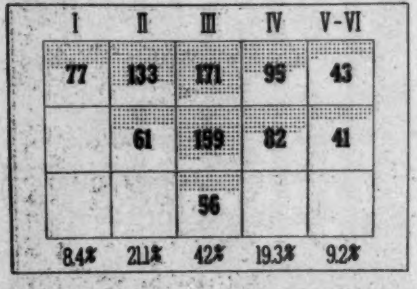

Fig. 2.—Classification of 918 natural central incisors into five brilliance steps and three saturation steps, showing the number of teeth in each step and the percentage of occurrence for each group

Saturation

Saturation is that attribute of a color which distinguishes it from a neutral gray of the same brilliance. For an example, shades 66 and 62 on the New Hue shade guide[3] may be compared. Shade 66 is the more saturated color because it has more yellow hue in it. Shade 62 is less saturated because it is grayer. It is still yellow, but the yellow is not as strong as in 66; therefore it is less saturated. These two colors are, for all practical purposes, of the same brilliance; 62 is not darker nor lighter than 66; it is only grayer.

Gray modifications of most of the six brilliance steps are needed in order to make the shade guide useful and complete. Classification of the 2,548 natural anterior teeth established two steps of saturation for the second group, three for the third group and two each for the remaining groups (Fig. 2). The first group requires only one step, but the third group, which includes 42 per cent of the patients requiring replacements, has three saturation steps. Shade guide teeth should be arranged in this manner for the convenience of the dentist. The most saturated teeth should occupy the top row. The first degree of gray modification should lie in the second row and the grayest tooth in the third row. For further convenience, the teeth in the various groups should lie directly over each other. Then in the case of an edentulous patient, who is between 30 and 45 years of age, the dentist will make the selection from the third group with the knowledge that any one of these colors in this group will be correct in brilliance. The question of just which of the three shades to use will depend on other factors such as com-

3. Manufactured by the Dentists' Supply Co. of New York.

plexion, size of the tooth and shape of the tooth.

One of the popular commercial shade guides may be analyzed and adapted to this plan in order to place this idea of color selection on a more practical basis (Fig. 3). Six square spaces are arranged from left to right to represent the six most saturated brilliance steps. A square is added beneath each square except Group I, and a third square is added beneath Group III. Within these squares the shade numbers of the shade guide are placed, the ones that best fit the requirements established being selected.

There is no tooth on the shade guide for Group I, the lightest color. Group II is accommodated by shades 66 and either 62 or 63 since shades 62 and 63 are almost identical in color and differ only slightly in blending. In Group III, in which the greatest number of teeth are needed, there is only one shade—65. In Group IV there are shades 67 and 69. For Group V there are shades 73 and 77, although 73 is considerably more saturated than it should be. Shades 85, 81 and 79 are left for Group VI. Shade 85 is oversaturated and 79 is outside the field of tooth color in hue. Shade 81 is a good tooth color and could be placed in the upper row of Group VI.

The usefulness of any shade guide can be evaluated in this manner by remembering that shades 66 and 62 are good colors for Group II and that 67 and 69 are good colors for Group IV. These four shades provide sufficient key colors so that the remaining shades can be estimated easily.

Complete Dentures

When artificial teeth for the edentulous patient are selected, the mold of tooth should be selected first. A central incisor of the mold selected should be compared with the shade guide tooth in order to note the similarity in shape and size. If the tooth selected is larger, is thicker labiolingually or has more convexity of face, it will usually be stronger in color than the shade guide tooth. On the other hand if it is small, if it is thinner labiolingually or if it has a flatter face, it will be grayer than the shade guide tooth. Porcelain pins on the shade guide tooth have a tendency to strengthen its color, and base metal pins have the opposite effect.

Denture base materials will also affect the color of the teeth in the finished denture. Vulcanite is ruinous to the color of any artificial tooth. Stainless metal bases when used in connection with a synthetic resin base will affect the color of the resin if the metal is allowed to cover the ridge. This, in turn, will gray the porcelain teeth. A gold base is much more satisfactory from an esthetic point of view.

It is well to remember, in the selection of a color, that teeth will never appear as light and saturated after they have been waxed up or processed in a denture base material as they do on the carding wax or in the shade guide. The more a tooth is enveloped in base material, the grayer and darker it will appear. Trimming the material high on the necks of the teeth and away from the interproximal spaces always saturates the color of the teeth. When for some reason trimming is not advisable, the most saturated tooth in the patient's age group should be selected if any graying effect by the base material is objectionable.

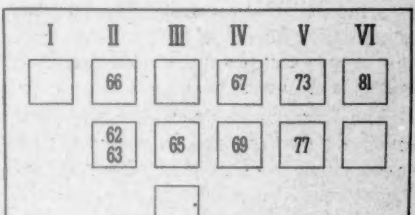

Fig. 3.—A plan of shade guide arrangement with shade numbers of a popular commercial shade guide introduced as they best fit the plan

The color of the base material is important. A light pink is preferable because of its effect on porcelain teeth. In a denture resin a color that is a few color steps toward an orange-pink is preferable to a color that is a few steps toward a bluish pink.

All of these influencing factors should be given consideration after the age group for the particular patient has been determined because they do affect the saturation of the tooth; in other words, they make the tooth appear either stronger or grayer in the finished denture. Since the shade guide teeth have been classified so that there is a choice of two or more teeth in each age group, except the first, the dentist can anticipate the color changes that might occur and make his selection accordingly.

Complexion of Patient

These influencing factors may, in many instances, be only secondary to the complexion of the patient in determining which tooth of an age group to use. The newer porcelains are responsible for a tremendous improvement in the appearance of full dentures. Even with that improvement, the dentist should not use a color that is so much out of harmony with the patient's complexion as to call attention to the denture. If the patient has a large amount of color in the skin of the face, a gray tooth might result in an undesirable contrast. The contrary is also true, for, if a patient has a sallow or gray complexion, a saturated tooth might look out of place.

The harmony between skin and tooth color must be decided in daylight, preferably after 10 a.m. and before 2 p.m. Light from white clouds or from an overcast sky is preferable to that from a blue sky. Women, at such a time, will be using the proper daytime cosmetics. The cosmetics should not be removed. If the teeth are in harmony with the skin in daylight, they will also appear in harmony under artificial light at night. Selection of tooth color should not be made under artificial light if it can be avoided.

Skin color is sometimes out of harmony with the age of the patient. In these cases, it may be necessary to select a tooth from a younger age group. This is more often true with women than with men. For certain men who have spent most of their lifetime out of doors it may be necessary occasionally to select a tooth from an older age group. However, this skin color must not be confused with a temporary suntan.

Temporary Dentures

Patients presenting for temporary dentures have at least some of their natural teeth remaining. When these patients ask for a duplication of their own teeth, the problem becomes one of color matching. Usually these patients ask for an esthetic improvement over their natural teeth. When improvement in color is requested, a selection should be made in the manner herein suggested. If, within the judgment of the dentist, the selected color is actually an improvement over that of the natural teeth, it should be used; otherwise, the natural teeth should be matched as closely as possible.

Natural teeth darken with advancing age primarily because of a morphologic change within the dentin and because of the increasing amount of stain and other markings acquired from an outward source. Therefore, the artificial teeth used for patients in the older groups often require a considerable amount of staining. Most stains are darker than the dominant color of the teeth so that a lighter shade should be selected when staining is contemplated in order that the finished result will not be darker than the patient's requirements.

When stains are fired on soldered pins, the pins should be protected with some type of investment material so that temperatures ranging from 1,700 to 1,800 F.

can be used safely.[4] The grinding of stains in a Wedgewood mortar under glycerin and water will lower their fusing point and improve their working qualities. If these ground stains are kept moist in an airtight container, they will always be ready for use without further mixing.

The final consideration in the color phase of full denture construction should be given to the manner in which anterior teeth are arranged in the setup. "Staggering" of shades is not necessary in most cases because artificial teeth are now furnished with dark cuspids. Something should be done to break up the similarity of incisors which are of the same color. The setting of each anterior tooth in a slightly different plane, as taught and practiced by J. B. LaDue[5] and others, takes advantage of different light reflections and effects a most satisfactory esthetic result.—*635 Union Trust Building.*

4. Warburton, W. L., Reproduction of Individual Characteristics of Tooth Form, Color and Arrangement in Full Denture Prosthesis. *J.A.D.A.* 26:769 (May) 1939.

5. LaDue, J. B., Personal communication.

ABRASION TESTS FOR ARTIFICIAL TEETH

V. S. Boddicker, D.D.S., Phoenix, Ariz.

One of the important characteristics of the materials used in artificial teeth is the resistance to abrasion and chipping under the stresses of mastication. It has long been recognized that persons with heavy bites will experience chipping and breaking of porcelain teeth in their dentures. It has also been recognized that unglazed or rough porcelain teeth in occlusion with gold restorations will abrade the gold to a noticeable degree. Some of the available data suggest that the most recently introduced material for artificial teeth, methyl methacrylate, may be unable to resist wear under certain conditions.[1] Unfortunately there are few data to furnish estimates of the rate at which any of these materials may abrade when in use.

It seemed desirable therefore to plan simple tests that would give a measure of the abrasion which may occur under controlled circumstances.

Method

In this study, artificial dentures with porcelain teeth were occluded with dentures with acrylic teeth, with gold teeth and with porcelain teeth. These materials opposing each other in the dentures were milled in a mechanical device known as a Kelley grinder, as shown in the accompanying illustration. Measurements of the resulting abrasion furnish a basis for comparison of the resistance of these materials to wear.

The test dentures were made by occluding full upper and lower sets of teeth in wax just as they are arranged in full dentures. Anatomic form posterior teeth were used in all instances, and all teeth were set to a balanced

1. Saffir, J. A., Further Studies in Evaluating Acrylics for Masticatory Surface Restorations. *J.A.D.A.* 31:518 (April 1) 1944.

A denture mounted on the Kelley grinder

occlusion. The models were carried through the flasking and packing processes to replace the wax bases with acrylic resin. The occlusion was not adjusted before milling began but was tested with articulating paper. The surface contact in each instance was found to be approximately two-thirds that found in well adjusted occlusions.

Opposing dentures mounted on a Gysi Simplex articulator were attached to the Kelley grinder. The grinding machine, when adjusted, was capable of moving the upper jaw member of the articulator from side to side in equal movements, producing two hundred movements per minute to the right and two hundred movements per minute to the left. The rate of movement was constant throughout the tests.

The upper and lower dentures were held in occlusal contact by elastic bands. A relatively light force of six pounds was used on all dentures for the first two tests. The force was increased to twenty-five pounds for the third test. The amount of force holding opposing teeth in contact was measured by use of a spring scale to determine the amount of force which, when applied in the center of the upper denture, brought the opposing teeth just out of occlusal contact.

In order to prevent the heat of friction and abraded particles from influencing the amount of wear of the various materials, the teeth were kept moist by a mist of water blown onto them during the grinding tests. In one of the tests an abrasive paste was used and no water mist was employed.

Each denture was milled for twelve hours. Ten hours of the milling was done with a force of six pounds, one hour of milling was done with pumice abrasive paste under a force of six pounds and one hour with a twenty-five pound force with no abrasive paste.

The vertical distances between the upper and lower jaw members of the articulator when the opposing teeth were in centric relation, when they were in right lateral position and when they were in left lateral position were measured with a Boley gage and recorded. To determine the amount of change in vertical height caused by abrasion and breakage during the milling, similar measurements were made after each test. The measurements were repeated and rechecked and are computed to be accurate within 0.02 mm.

Findings

Trubyte New Hue[a] porcelain teeth were used for the porcelain abrasion tests. When porcelain was milled against porcelain, the decrease in vertical height was excessive and appeared to be caused by breakage much more than by wearing away. In the first test, in which the opposing dentures were milled under six pounds of pressure for ten hours, four buccal cusps and two incisal edges were chipped. Porcelain teeth abraded only 0.1 to 0.2 mm. during the test with pumice paste, but under twenty-five pounds of pressure the porcelain teeth shattered and milling had to be discontinued. It might be concluded from these results that porcelain when ground

a. Manufactured by the Dentists' Supply Company of New York.

against porcelain is a friable material but withstands abrasion (exclusive of chipping) fairly well.

Teeth were cast in hard Type C gold for the test opposing porcelain teeth. The milling of glazed porcelain against gold caused a loss in vertical dimension of only 0.1 mm. or less during ten hours of light pressure grinding. During the test with the abrasive paste the rate of abrasion of gold was increased greatly but the surface of the porcelain was barely roughened. Heavy pressure grinding caused only slight wear of the gold, and the opposing porcelain was still rather smooth.

The first acrylic teeth tested were Justi Denta Pearl[3] teeth of the type first placed on the market and will be referred to as acrylic (A) teeth. The acrylic (A) teeth abraded moderately during the light pressure test but wore down excessively when ground with abrasive paste. Wear was also rapid during the grinding under heavier pressure. This result agrees with the report of Saffir.[1]

Injection molded Justi Denta Pearl[3] teeth, acrylic (B) teeth, were then tested. The rate of abrasion in the light pressure grinding and in the abrasive paste test was nearly the same as for the acrylic (A) teeth. During the grinding under heavy pressure, the wear was considerably less for the acrylic (B) teeth than it had been for the acrylic (A) teeth. It was apparent that acrylic (B) teeth stood up under heavy pressure better than either acrylic (A) or porcelain teeth.

A set of acrylic (A) teeth was opposed by Type C gold teeth for the next testing models. Grinding with six pounds of pressure caused a rapid abrasion of the acrylic teeth but slight wear on the gold. The wear of the acrylic teeth was also rapid for both the pumice paste and the heavy pressure tests. The wear of acrylic resin with respect to gold was estimated by observation to be in the ratio of 5 to 2.

Trubyte New Hue teeth were ground against acrylic (A) teeth for the last series of tests. Wear of acrylic (A) teeth was moderate during both the light and heavy pressure tests but was more rapid when the teeth were ground with abrasive paste. The porcelain teeth in this model were not abraded enough to remove the glaze from the occlusal surfaces.

The amount of loss in vertical height produced in each instance by the three grinding tests is shown in the table.

Some of the observations made as to wear and breakage of the various kinds of teeth during the grinding tests are significant. The porcelain teeth which opposed porcelain lost a large amount of their cusp height and occlusal anatomic structure as a result of breakage. It was interesting to note that, although porcelain when milled against porcelain chipped and broke excessively, porcelain when opposed by either of the less friable materials, acrylic resin or gold, did not break or chip at all. Neither of the two types of acrylic teeth experienced any appreciable amount of breakage during the tests. The lack of breakage of acrylic teeth during these tests verifies the reports[4] from studies of the physical properties of acrylic resin which show it to be very satisfactory with respect to breakage. Because there was virtually no chipping of cusps, the acrylic teeth maintained good occlusal anatomic structure in spite of excessive wear.

Clinical Application

The results of the experiment show that acrylic teeth wear away more rapidly than either porcelain teeth or hard gold teeth. These results tend to agree

3. Manufactured by H. D. Justi & Son, Inc., Philadelphia.

4. Peyton, F. A., and Mann, W. R., Acrylic and Acrylic-Styrene Resins: Their Properties in Relation to Uses as Restorative Materials. *J.A.D.A.* 29:1852 (October 1) 1942.

Abrasion rate of acrylic and porcelain teeth

Case	Wear (in mm.)											
	Test 1 (6 lbs. pressure, 10 hrs. grinding)			Test 2 (Abrasive paste, 6 lbs. pressure, 1 hr. grinding)			Test 3 (25 lbs. pressure, 1 hr. grinding)			Total		
	Central	Right lateral	Left lateral	Central	Right lateral	Left lateral	Central	Right lateral	Left lateral	Central	Right lateral	Left lateral
Porcelain against porcelain	0.5	0.7	1.4	0.2	0.1	0.2	Discontinued because of breakage of teeth			0.7*	0.8*	1.6*
Porcelain against gold	0.00	0.1	0.05	0.3	0.8	0.8	0.1	0.2	0.1	0.4	1.1	0.95
Acrylic (A) against acrylic (A)	0.3	0.2	0.2	1.00	1.1	1.3	0.7	1.00	0.7	2.00	2.3	2.2
Acrylic (B) against acrylic (B)	0.1	0.4	0.4	1.3	1.3	1.5	0.1	0.4	0.2	1.5	2.1	2.1
Acrylic (A) against gold	0.3	0.45	0.6	0.7	0.9	0.65	0.3	0.3	0.2	1.3	1.65	1.45
Porcelain against acrylic (A)	0.2	0.4	0.4	0.5	0.6	0.5	0.1	0.5	0.35	0.8	1.5	1.25

*An added abrasion would have occurred had Test 3 been continued.

with the works of other investigators who have tested the abrasion of acrylic teeth and the physical properties of acrylic resin.[1,3] The acrylic (B) teeth, however, resisted abrasion satisfactorily under heavy pressure grinding when no abrasive paste was present. Neither porcelain nor acrylic resin stood all of the grinding tests satisfactorily. It might be desirable, therefore, to interpret the observations and results, giving them a clinical or practical application.

Porcelain teeth probably are indicated for the average patient whose case involves no problems since porcelain apparently abrades less rapidly than acrylic resin and the average patient does not experience excessive breakage of porcelain teeth.

The patient who exerts excessive masticatory stresses might obtain better service from dentures with acrylic (B) teeth since these teeth stood the test of heavy pressure grinding most satisfactorily.

Acrylic teeth or metal teeth are indicated for use in closed bite cases in which it is desirable to replace teeth in small spaces with a material less friable than porcelain.

Acrylic teeth when milled against gold abraded rapidly. It is common knowledge that gold is abraded rapidly when worn against roughened or unglazed porcelain. In instances in which a denture is to oppose gold restorations, the denture, probably being the easier to re-

3. Beall, J. R., Wear of Acrylic Resin Teeth (Progress Report). *J.A.D.A.* 30:250 (February 1) 1943.

place, should have acrylic teeth. If the opposing gold restorations can be replaced more readily, a more durable denture with porcelain teeth should be constructed.

The abrasive paste caused acrylic teeth to abrade rapidly when the acrylic teeth were milled against porcelain teeth. Since unglazed or roughened porcelain might imitate the action of abrasive paste, it would seem advisable, if a denture with acrylic teeth is to oppose one with porcelain teeth, that grinding or adjusting of occlusion be confined to the acrylic teeth, the opposing porcelain being left highly glazed.

Unless other conditions make their use imperative, acrylic teeth probably are contraindicated for patients who chew abrasive tobacco.

Further studies should be made of the relative merits and demerits of these materials under controlled conditions in order that their future satisfactory use may be more accurately predicted.—*1036 East McDowell Road.*

COMMON AILMENTS OF DENTISTS: A STATISTICAL STUDY

Louie T. Austin,* D.D.S., and Gustav O. Kruger,† D.D.S., Rochester, Minn.

Since the health of the dentist is of importance to the dental profession, it was decided that it might be of interest to review the physical findings in a group of dentists who came to the Mayo Clinic for examination. The case records of all dentists who registered here during the calendar year 1940 were reviewed. That year was a prewar and postdepression year when general business conditions might be said to be reasonably normal. Two hundred and seventy-three dentists presented themselves in 1940 for examination. They ranged in age from 22 years to more than 70 years with a mean age of 48.2 years (Table 1); 122 (45 per cent) were less than 45 years old and 151 (55 per cent) were 45 years of age or more. All were white men with the exception of two colored men and two white women.

In the study of the incidence of diseases, the diagnostic classification was taken from the clinic master file and included only conditions which the clinician thought important enough to cross index. Incidental findings not bearing on the case were not cross indexed. The terminology was that of the clinician making the diagnosis.

There was a greater total number of clinical conditions listed than the number of dentists seen. Some case records had one condition listed, whereas others had multiple diagnoses, one as many as seven.

According to Table 2 the greatest incidence of disease involved the gastrointestinal tract. Ophthalmologic conditions were the next most frequent, followed closely by genito-urinary conditions and by conditions of the exhaustion state. Cardiac, proctologic and dermatologic diseases ranged in close order.

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Table 1.—Dentist patients of the Mayo Clinic, 1940: distribution by age

Age, years	Cases	Per cent
20–29	11	4.0
30–39	58	21.2
40–49	96	35.3
50–59	55	20.1
60–69	48	17.6
70 or more	5	1.8
Total	273	100.0
Mean	48.2 years	

Encountered less frequently were rheumatic conditions, malignant lesions, occupational diseases and orthopedic conditions.

The greatest amount of gastro-intestinal disease was found in the group of dentists 45 years of age or more (49 cases), and only 21 cases occurred in the group less than 45 years of age.

In gastro-intestinal disease the incidence of duodenal ulcer outshadowed that of all other conditions (Table 3,A). Duodenal ulcer was encountered twenty-seven times (39 per cent of cases of gastro-intestinal disease and 9.9 per cent of total cases). Broken down into age groups, 17 older men had duodenal ulcer, whereas 10 younger men had it.

In a recent informal survey at the clinic of a large group of physicians, an incidence of 35 to 40 per cent of duodenal ulcer was estimated, compared with a 9.9 per cent noted in this study.

Rivers and Mendes Ferreira[1] in a recent survey found that in 10,000 consecutive records of patients 15 years of age or more 42 per cent had dyspepsia in some degree, and that 27 per cent of men between the ages of 25 and 40 years referred to the gastro-intestinal section had duodenal ulcers (as compared with 14 per cent in the present survey).

Gallbladder disease occurred in 14 cases (20 per cent of all cases of gastro-intestinal disease) in the present series. Rivers listed gallbladder disease as the second most frequent cause of dyspepsia, preceded by functional conditions and followed by peptic ulcer. Six cases of gastro-intestinal malignant lesions were listed under malignant conditions rather than under gastro-intestinal disease. The incidence of gastro-intestinal malignant lesions compares favorably with that in Rivers' survey.

Although the incidence of duodenal ulcer and gallbladder disease is high as compared with that of other gastro-intestinal conditions (Table 3,A), both conditions are of lower incidence among dentists as a whole than among patients of all occupations or among a similar group of physicians.

In eye conditions, which constituted 21.2 per cent of all cases, presbyopia was encountered twenty-eight times (48 per cent) in a total of 58 cases of ophthalmic disease (Table 3,B). Of the older group, 17.2 per cent were afflicted while the younger group showed a mere 1.6 per cent. Astigmatism was encountered thirteen times (22 per cent). The remainder were cases of pathologic ophthalmic conditions. The incidence of eye conditions is lower among dentists than among patients in general. The observation has been made that although a dentist uses his eyes more than the general population, he notices small variations from the normal in his eyesight and is more careful to have a close check frequently.

Genito-urinary diseases were encountered in 20.5 per cent of all cases and consisted principally of prostatic disease. The statement has been made that some degree of prostatitis is present in all men more than 40 years of age. This is borne out by the fact that prostatitis was the

1. Rivers, A. B. and Mendes Ferreira, A. E., Incidence and Causes of Chronic Dyspepsia of Various Ages; Analysis of 4,023 cases. *J.A.M.A.* 110:2132, (June 25) 1938.

most frequent individual diagnosis in our survey, having been encountered in 12.1 per cent of all cases. The condition was present in 19.2 per cent of the older group of 151 dentists and in 3.3 per cent of the younger group of 122 dentists. These are cases in which prostatitis was considered serious enough to be cross indexed (Table 3,C).

There were 51 cases of the exhaustion state (Table 4,A). Chronic nervous exhaustion[2,3] totaled 23 cases, gastro-intestinal disturbance accounted for 13, tension state totaled 4 and neurosis, 5 cases.

2. Macy, J. W. and Allen, E. V., A Justification of the Diagnosis of Chronic Nervous Exhaustion. *Ann. Int. Med.* 7:861 (January) 1934.

3. As defined by Macy and Allen,[2] "Chronic nervous exhaustion indicates a long-present, subjective sensation of tiredness, disproportionately exceeding the effort which produces it and which cannot be accounted for by organic disease." They go on to say that "weakness, lack of energy and ambition, nervousness, unrestful sleep or insomnia, melancholia, tachycardia, and pains and aches in various parts of the body may be additional symptoms of the condition."

It is interesting to note the relatively greater incidence in the younger age group. The exhaustion state was present in 14.6 per cent of the older group and in 23.8 per cent of the younger group. The nature of the work of a dentist is confining and there is considerable pressure in the time schedule. It would seem that the older men had succeeded in adjusting themselves fairly well. The younger group had had difficulty in making adjustment.

Duodenal ulcer, although not intimately connected with the exhaustion state, nevertheless is usually associated with tension. If the cases of duodenal ulcer were added to the cases of exhaustion, the total would eclipse any other group of conditions in the survey. Still the incidence is not as great as that found in similar professions, according to one of the neurologists at the clinic, and is

Table 2.—Dentist patients of the Mayo Clinic, 1940: incidence of diseases according to general diagnostic classification

Diagnostic classification	Total group		Age: Less than 45 years		Age: 45 years or more	
	Cases	Per cent of 273 cases	Cases	Per cent of 122 cases	Cases	Per cent of 151 cases
Gastro-intestinal	70	25.6	21	17.2	49	32.5
Eye	58	21.2	19	15.6	39	25.8
Genito-urinary	56	20.5	14	11.5	42	27.8
Exhaustion state	51	18.7	29	23.8	22	14.6
Cardiac	45	16.5	8	6.6	37	24.5
Proctologic	44	16.1	19	15.6	25	16.6
Skin	40	14.7	17	13.9	23	15.2
Rheumatic diseases	31	11.4	14	11.5	17	11.3
Malignant	23	8.4	3	2.5	20	13.2
Occupational	16	5.9	5	4.1	11	7.3
Orthopedic	16	5.9	8	6.6	8	5.3
Miscellaneous	123	45.1	49	40.2	74	49.0

Table 3.—Dentist patients of the Mayo Clinic, 1940

A. Gastro-intestinal disease

Diagnosis	Cases	Diagnosis	Cases
Duodenal ulcer	27	Hepatosplenomegaly	1
Gallbladder disease	14	Ulcerative colitis	1
Appendicitis	4	Pancreatitis	1
Constipation	4	Diarrhea	1
Polyps of sigmoid	3	Biliary cirrhosis	1
Gastric ulcer	2	Parenchymatous hepatic disease	1
Alcoholic gastritis	2	Gastric hypo-acidity	1
Diverticulitis of sigmoid	1	Ileosigmoidal fistula	1
Hyperacidity	1	Gastric hemorrhage	1
Jejunitis	1	Pylorospasm	1
Intestinal obstruction	1	Total	70

B. Eye conditions

Diagnosis	Cases	Diagnosis	Cases
Presbyopia	28	Retrobulbar neuritis	1
Complex hyperastigmatism	9	Subnormal accommodation	1
Simple astigmatism	4	Vitreous hemorrhages	1
Glaucoma	3	Retinal detachment	1
Iritis	2	Muscle condition	1
Choroiditis	1	Chorioretinitis	1
Conjunctivitis	1	Optic atrophy	1
Lid entropion	1	Thrombus (central artery)	1
Arteriosclerotic retinitis	1	Total	58

C. Genito-urinary disease

Diagnosis	Cases	Diagnosis	Cases
Prostatic disease	33	Spermatocele	1
Syphilis	9	Hypogonadism	1
Urethritis	3	Inflammation of testis	1
Ureteral calculus	2	Impotence	1
Nephrolithiasis	2	Perinephric abscess	1
Hydrocele	2	Total	56

Table 4.—Dentist patients of the Mayo Clinic, 1940

A. Exhaustion state

Diagnosis	Cases	Diagnosis	Cases
Chronic nervous exhaustion	23	Cardiac neurosis	2
Functional gastro-intestinal disturbance	13	Depression	3
Chronic tension state	4	Sexual impotence (functional)	2
Anxiety neurosis	3	Syphilophobia	1
		Total	51

B. Cardiac disease

Diagnosis	Cases	Diagnosis	Cases
Hypertension	21	Chronic mitral endocarditis	1
Coronary thrombosis	2	Aortic insufficiency	2
Coronary sclerosis	7	Auricular fibrillation	1
Arteriosclerotic heart disease	1	Tachycardia	1
Myocardial infarction	3	Hypotension	1
Angina pectoris	2	Heart failure	2
Endocarditis	1	Total	45

C. Proctologic conditions

Diagnosis	Cases	Diagnosis	Cases
Hemorrhoids	27	Rectal polyp	3
Pruritus ani	7	Pilonidal cyst	2
Rectal fistula	4	Diverticula	1
		Total	44

D. Skin conditions

Diagnosis	Cases	Diagnosis	Cases
Dermatitis	7	Ragweed dermatitis	1
Eczema, occupational	6	Sycosis barbae	1
Eczematoid dermatitis	4	Alopecia	1
Neurodermatitis	4	Folliculitis	1
Actinodermatitis	3	Hyperkeratosis	1
Seborrheal dermatitis	3	Senile verrucae	1
Trichophytosis	2	Acne	1
Dermatitis venenata + stasis	2	Pemphigus	1
Urticaria	1	Total	40

Table 5.—Dentist patients of the Mayo Clinic, 1940: rheumatic diseases

Diagnosis	Cases
Arthritis	
Osteo-arthritis	
Primary (idiopathic)	7
Secondary (post-traumatic)	2
Rheumatoid spondylitis	4
Nonarticular rheumatic disease	
Fibrositis (periarticular, intramuscular)	5
Periarthritis of shoulder	2
Bursitis	1
Gout	1
Suppurative arthritis	1
Postural backache	4
Indeterminate backache	2
Psychogenic rheumatism	2
Total	31

not as great as would be expected, considering the nature of the work.

Cardiac disease was encountered in 45 instances, constituting 16.5 per cent of the total (Table 4,B). The most frequent variety of cardiac disease was hypertension, with 21 cases (47 per cent of cardiac diagnoses). The incidence of hypertension was greatest in the older group (11.9 per cent) and least in the younger group (2.5 per cent). Six cases of vascular conditions which were classified under miscellaneous conditions were not included in the group of cardiac disease.

The incidence of hypertension and of other cardiac entities was considered by a cardiologist as that which could be expected and in about the usual proportions.

Proctologic conditions were principally cases of hemorrhoids (Table 4,C). The distribution of proctologic conditions between the two age groups was almost equal, a fact which emphasizes the hereditary background for rectal conditions.

Skin conditions totaled 40 (14.7 per cent of all diagnoses). Again the older group had 15.2 per cent, and the younger group showed 13.9 per cent which is approximately equal. The diagnoses were numerous and not related to each other. The two main diagnoses were dermatitis with 7 cases and occupational eczema with 6 cases. The latter were usually reactions from amalgam, mercury or procaine hydrochloride (Table 4,D).

Rheumatic diseases (Table 5) were found in 11.4 per cent of the total group. Their incidence was equal between the older and younger groups. This is considered by the section on arthritis to compare favorably with the percentage found in all patients seen in 1940 although no statistics are available. The classification divides the cases of purely articular involvement from those in which the structures around a normal joint are involved. There were 13 cases of arthritis compared with 8 cases of periarticular involvement.

There are several cases of backache in each classification, although they are not listed as such. These are the cases similar to those which are to be found in the general population, and the backache may or may not have been aggravated by the operating position. In 273 cases only 4 clear-cut postural backaches were listed.

Malignant conditions were listed according to region rather than to patho-

Table 6.—Dentist patients of the Mayo Clinic, 1940: malignant conditions

Region	Cases	Region	Cases
Colon	6	Spinal cord	1
Prostate	3	Face	1
Tongue	3	Parotid	1
Larynx	3	Submaxillary	1
Finger	2	Femur	1
Bladder	1	Total	23

Table 7.—Dentist patients of the Mayo Clinic, 1940

A. Occupational diseases

Diagnosis	Cases	Diagnosis	Cases
Skin disease	11	Foot disease	1
Backache, postural	4	Total	16

B. Orthopedic conditions

Diagnosis	Cases	Diagnosis	Cases
Detached cartilage of knee	1	Structural scoliosis	1
Fractured humerus	1	Epicondylitis	1
Metatarsalgia of left foot	1	Miscellaneous (neuromuscular)	1
Flatfoot	1	Protruded intervertebral disk	3
Bucket-handle fracture of semilunar cartilage of knee	1	Chronic epidural abscess with sequestrum of mastoid	1
Osteomyelitis, chronic nonoccupational, of third metacarpal	1	Congenital anomaly of sacro-iliac and lumbosacral joints	1
Bilateral calcification of Achilles tendon	1	Periostitis of patella	1
		Total	16

C. Miscellaneous conditions

Diagnosis	Cases	Diagnosis	Cases
Ear, nose and throat	30	Diabetes	6
Respiratory + tuberculosis	13	Obesity	6
Hernia	13	Blood dyscrasia	3
Thyroid	7	Migraine	3
Arteriosclerosis	7	Sciatica	3
Varicose veins	7	Other conditions	19
Vascular	6	Total	123

logic type. Six cases of malignant lesions of the colon formed the only outstanding group (Table 6). Other findings were insignificant with the possible exception of 2 cases of postradiation carcinoma on fingers.

Malignant lesions occurred in 8.4 per cent of the total cases. Twenty of the older group had malignant lesions as contrasted to 3 in the younger group.

From a pathologic viewpoint, the malignant lesions of the colon and of the

Table 8.—Dentist patients of the Mayo Clinic, 1940: incidence of the most common diagnoses

Specific diagnosis	Total group		Age: less than 45 years		Age: 45 years or more	
	Cases	Per cent of 273 cases	Cases	Per cent of 122 cases	Cases	Per cent of 151 cases
Prostatitis	33	12.1	4	3.3	29	19.2
Presbyopia	28	10.3	2	1.6	26	17.2
Duodenal ulcer	27	9.9	10	8.2	17	11.3
Hemorrhoids	27	9.9	12	9.8	15	9.9
Nervous exhaustion	23	8.4	14	11.5	9	6.0
Hypertension	21	7.7	3	2.5	18	11.9
Occupational dermatitis	11	4.0	1	0.8	10	6.6

prostate were carcinomas, those of the tongue were squamous cell epitheliomas, those of the larynx were epithelial hyperplasias of the vocal cords, those of the fingers were actinodermatitis, the lesion of the face was an epithelioma, and both tumors of the salivary glands were mixed tumors.

Of a total of 16 clear-cut occupational conditions, 11 were dermatologic (Table 7,A). These were broken down into 6 cases of occupational eczema, 2 cases of actinodermatitis after exposure to roentgen rays and 3 cases of eczematoid dermatitis.

There were only 4 cases of backache definitely cross indexed with posture, as mentioned previously.

A good many of the other conditions described in the survey, particularly in the exhaustion state and its ramifications, were associated with the occupation, although not actually cross indexed as such on the master file. No attempt was made to differentiate stress into occupational and nonoccupational, although most of the patients who suffered from stress were advised to take a vacation or otherwise relax in their practice.

There were 16 cases of orthopedic conditions (Table 7,B). They are the types to be found in a general sampling of patients and are not considered significant or associated with the profession.

Under miscellaneous conditions, the remaining conditions found in the survey were grouped because of infrequency rather than seriousness of disease (Table 7,C). Involvement of ear, nose and throat was encountered most frequently (11.0 per cent of total cases), followed by respiratory diseases and tuberculosis (13 cases) and hernia (13 cases) in some of which the hernia was bilateral.

The 19 cases of "other conditions" included multiple sclerosis, narcolepsy, fibroma, lipoma, muscular atrophy, dental conditions, trifacial neuralgia, abuse of tobacco, hypohidrosis, headache, albuminuria and renal glycosuria.

There were 2 cases in which no definite diagnosis was made and 2 cases not included in the survey in which the results of examination were negative.

Data on the conditions most commonly diagnosed are given in Table 8.

Comment

This group of 273 dentist patients was

but 0.4 per cent of the total patients for 1940 and represents only a small sample of all those registered. It would be difficult to compare these findings with the findings for all men of similar age group for that year. The figures show the diagnoses for this group only and are probably of little significance. From this sampling and from discussions with various members of the staff of the Mayo Clinic, it might be safe to say that we as dentists are probably a reasonably healthy and fortunate group in our chosen profession. —*102 Second Avenue, South West.*

MESENTERIC LINE OR PIGMENTED PLAQUE: A SIGN OF COMPARATIVE FREEDOM FROM CARIES

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THE need exists for further methods of prognosticating the future caries experience of an individual. Pickerill[1] referred to a "mesenteric line"[2] as a sign of immunity, but Bunting[3] wrote that "we cannot concur in this opinion as we have found many instances in which definite black lines similar to that which Pickerill describes have been present in mouths in which caries is very active."

Bibby[4] examined 100 New Zealand children with the brown stain and named it the "pigmented dental plaque." As a basis for comparison, he examined 1,000 children (divided into 10 control groups) who had no apparent pigmented plaques. Each group of 100 was composed of the same number of patients of ages corresponding to those of the special group. Bibby concluded "that there is a lessened incidence of caries associated with this brown plaque."

To ascertain the correlation of this pigmentation in a population with comparative freedom from dental decay, the present investigation was undertaken in India.

Mesenteric Line

The mesenteric line or pigmented dental plaque is formed by the coalescence of certain dark brown spots. It is situated on the enamel at the cervical margin of the tooth and follows the contour of the gingiva. It is usually a thin dark line. The stain, as described by Pickerill, varies from light to very dark brown in color and from 0.5 to 1 mm. in width. It appears to be in the form of a "deposited film (?) of calculus" in that it can be removed by instrumentation. Although the film is attached to the tooth, its thickness is not apparent to the naked eye. It may and does occur at any age from infancy to advanced age. In this study, the presence or absence of the line was recorded as follows: (1) no line, (2) incomplete

Division of Dental Research, School of Medicine and Dentistry, University of Rochester.

1. Pickerill, H. P., A Sign of Immunity. *Brit. D.J.* 44:967 (September 1) 1923.

2. The term "mesenteric line" was used "empirically and for want of a better name" because of the suggested association between this line and the mesenteric group of micro-organisms.

3. Bunting, R. W., *Oral Pathology*. Philadelphia: Lea & Febiger, 1929.

4. Bibby, B. G., A Study of a Pigmented Dental Plaque. *J. D. Res.* 11:835, 1931.

Table 1.—Mesenteric line in teeth of 1,097 Indian boys

Age, years	Mesenteric line*	Boys	Caries free, per cent	Deciduous teeth		Permanent teeth		All teeth, per cent carious
				Number	Carious, per cent	Number	Carious, per cent	
13	1	224	30.8	222	33.8	5,903	8.4	9.4
	2	22	36.2	5	20.0	601	4.8	4.9
	3	14	57.1	11	18.1	373	3.2	3.6
14	1	294	37.0	68	23.6	8,114	8.2	8.3
	2	31	51.6	13	7.6	847	5.8	5.8
	3	25	64.0			700	2.3	2.3
15	1	277	36.1	33	30.3	7,709	8.1	8.2
	2	25	68.0			706	4.7	4.7
	3	10	40.0			278	9.3	9.3
16	1	122	35.2	11	9.0	3,419	8.8	8.8
	2	10	50.0			285	3.6	3.6
	3	13	61.5			366	2.2	2.2

*1, no line; 2, incomplete coalescence of pigmented spots, and 3, continuous pigmented line formed by pigmented spots.

coalescence of pigmented spots, and (3) continuous line formed by pigmented spots.[5]

Recording

The information was recorded in the same manner as in earlier surveys.[6-8] A detailed dental inspection, in which all the available tooth surfaces in the mouth were examined by use of a dental mirror and probe, was made in each case. The total number of teeth and the number of deciduous teeth (when present) and of permanent teeth were recorded. All extracted teeth were recorded as carious, except when known to have been lost as the result of trauma or for some other reason. In recording the extent of caries the following classification of Day and Sedwick[9] was employed:

1. Initial caries including softened or discolored pits and fissures giving lodgment to a fine explorer.

2. Freely accessible approximal cavities and small open cavities involving less than one-fourth of the tooth.

3. More extensive caries involving more than one-fourth and less than two-thirds of the crown.

4. Caries involving from two-thirds to complete destruction of the crown.

The total caries figure was calculated by multiplying the number of teeth under each of the heads previously mentioned by the corresponding number; that is, 1, 2, 3 or 4, as the case might be.

$$\text{The average caries figure} = \frac{\text{Total caries figure}}{\text{Number of teeth examined}}$$

Results

Altogether 1,097 boys from the Punjab (India) were examined. They were distributed in the age groups of 13, 14, 15 and 16 years. Among these the mesenteric line (pigmented plaque) was found to be present in 156 children.

Table 1 shows that children with no pigmented line are more susceptible to

5. Cases that showed the pigmented line in one or more teeth were recorded as positive. No attempt was made to correlate dental decay and the presence of the pigmented line in individual teeth.

6. Shourie, K. L., Dental Caries in Indian Children, *Indian J. M. Research* 29:709 (October) 1941.

7. Shourie, K. L., Dental Caries in Children in Madras City in Relation to Economic and Nutritional Status. *Indian J. M. Research* 31:561 (October) 1942.

8. Shourie, K. L., Fluorine and Dental Caries in India. *Indian J. M. Research* 34:97 (May) 1946.

9. Day, C.D.M., and Sedwick, H.J., The Fat-Soluble Vitamins and Dental Caries in Children. *J. Nutrition* 8:309 (September) 1934.

Table 2.—Comparison of mesenteric line in deciduous and permanent teeth of 1,097 Indian boys

Type of teeth	Mesenteric line*	Teeth	Carious, per cent	Extent of caries				Average caries, per cent
				1	2	3	4	
Deciduous	1	334	30.5	28	34	18	22	0.7
	2	18	11.1	0	1	0	1	0.33
	3	11	18.1	1	0	0	1	0.27
Permanent	1	25,745	8.3	1,252	577	109	143	0.09
	2	2,432	5.6	95	27	8	7	0.08
	3	2,145	3.3	48	17	0	6	0.05

*1, no line; 2, incomplete coalescence of pigmented spots, and 3, continuous pigmented line formed by pigmented spots.

caries than the ones with the line. The more marked the pigmentation is, the greater is the freedom from caries.

Statistical analysis of data showed that the total $x^2 = 30.7076$, and for eight degrees of freedom this is highly significant.

The percentage of carious teeth in each age group and in the total number of teeth also shows that there is a lesser incidence of caries in patients with the pigmented plaque. The same indication is given by the average caries figures.

In children with no mesenteric line, 30.5 and 8.3 per cent of deciduous and permanent teeth, respectively, were carious, and in children with a mesenteric line the percentages of deciduous and permanent teeth that were carious were 13.7 and 4.5 per cent, respectively (Table 2).

The fact that the existence of the mesenteric line was found to be associated with comparative freedom from dental caries may be of value in the prognosis of individual caries experience. — *260 Crittenden Boulevard.*

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Telescopes Are Not Enough. —While we cannot put brakes on intellectual adventure, it must be admitted that there is a lack of balance about our studies and our research that imperils the future. The disproportion between the physical power at our disposal and our capacity to make good use of it is growing with every day that passes. We are in the midst of a revolution in our physical environment so vast and so rapid that our minds can scarcely keep up with it. But there are other things that cannot keep up with it, either—notably our social ideas, our habits of life and our political and economic institutions. Our political institutions, for example, are mainly rooted in the eighteenth century, but our swiftly evolving technology is largely a twentieth century phenomenon. We have one foot in a civilization that is dying and another foot in a civilization that is struggling to be born. Consequently we live a kind of bifurcated existence, and the gap between what we know and what we need to know becomes wider and deeper. . . .

A prominent figure in Washington recently remarked that we must have "a sufficient mastery of nature so that permanent world peace will be a reality and not a mere hopeful expression of faith." With all due respect, it is this mastery of nature which threatens to blow our civilization into drifting dust. What we really need is a mastery of man's social nature—knowledge and more knowledge of the on-rushing social consequences of our machines, consequences which, because they are too intricate to be easily understood, are shaping our lives to ends we do not want but cannot escape.—*Raymond B. Fosdick, The Rockefeller Foundation: A Review for 1946. New York: Rockefeller Foundation, pp. 29-32.*

THE Journal OF THE
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LON W. MORREY, D.D.S., *Editor*

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EDITORIALS

SHOULD DENTISTS BE INCLUDED IN THE NATIONAL OLD AGE AND SURVIVORS' INSURANCE PLAN?

CONGRESS is expected to consider extending the benefits of the Social Security Act early in its next session. Senator E. D. Millikin of Colorado has appointed a seventeen man committee, representing labor, business and the professions, as the first step in revising the laws to grant old age pensions and unemployment compensation to groups not now covered by the Act. The largest of these groups are the agricultural workers, the domestic servants, the state and federal government employees and the self-employed. Dentists would be included in the last group.

Under the present law, the dentist, as an employer, is affected by the social security program only as a contributor. To the 1 per cent which he deducts from the salaries of his assistants he adds an equal amount and forwards the total to the Collector of Internal Revenue. Thus the dentist has the satisfaction of knowing that he is aiding his employees to provide themselves with security in their old age, but he must cope with the economic hazards of his own old age as best he can.

Under the present Social Security Act, old age insurance benefits are available to retired workers, aged 65 or more, or to their wives more than 65 years of age and to their dependent children. Contributions to support the old age insurance system are levied on workers and their employees alike, each contributing an amount equal to 1 per cent of employee wages up to $3,000 a year.

Since the beginning of the social security program the dental profession has taken an active interest in its operation and provisions. In 1940 the Board of Trustees, at the suggestion of the National Health Program Committee, instructed the Committee on Economics to make a study of ways and means of improving the social security of members of the dental profession. Representatives of the Committee on Economics held several conferences with representatives of the Bureau

of Old Age and Survivors Insurance to determine what steps, if any, the Social Security Board had taken toward including self-employed groups under the old age and survivors' insurance plan. The representatives of the American Dental Association were informed that the major problem involved in bringing the self-employed under the insurance plan was an adequate method of making collections on the basis of percentage of income as members of the self-employed groups are not on payrolls or any other such bookkeeping record. Until this problem is solved, independent professional people cannot be brought into the old age and survivors' insurance system. It may be that Senator Millikin's committee will find a solution to this problem.

The Committee on Economics of the American Dental Association also made an investigation as to what private insurance companies had to offer dentistry in the way of annuity insurance. Twenty-six of the leading insurance companies were consulted regarding an annuity insurance plan for members. Eighteen companies were not interested, two firms would offer no plan unless it included all members of the Association, five firms would offer no plan unless it included 75 per cent of the membership and one firm asked for a specific plan for consideration. It was apparent from the survey that the Association could not obtain annuity insurance for its members that would offer an advantage over the annuity policies now sold to the general public.

The question arises then: Do the members of the dental profession prefer to provide security for their old age by the customary practice of purchasing annuity insurance, or should the Association attempt to have the profession included in the contemplated amendments to the Social Security Act? The matter of extending old age benefits to dentists has been a subject of some controversy for at least seven years. As Congress soon may revise the social security program, an expression of opinion is desired from members of the Association as to whether dentists should be included under the old age and survivors' insurance plan. Members are invited to send their opinions to the Editorial Department of the Association. These opinions will assist the officers of the Association in determining what action should be taken in the best interest of the profession.

FINANCIAL STATUS OF THE AMERICAN DENTAL ASSOCIATION

So much has been published since the Boston meeting concerning the $312,000 deficiency budget adopted by the House of Delegates for the fiscal year 1947-1948 that some members may gain the impression that the Association is in financial straits. Such is not the case. The financial position of the Association is sound, and its officers and trustees intend that it remain so.

The net worth of the Association as of last July 1 was $1,904,000. Its assets are distributed among five funds: general, relief, THE JOURNAL, research and insurance. The ordinary operations of the Association are financed through the general fund, which consists of $1,007,000 in cash, securities and property. The relief fund, con-

sisting of $656,000 in cash and securities, was built up through the sale of Christmas seals. Only the income from this fund may be used, and then only for relief purposes. THE JOURNAL fund has been fixed by action of the Board of Trustees at $200,000 to assure publication of THE JOURNAL in the event that sufficient funds are not available from the usual sources. The $36,000 research fund consists of monies donated to further dental research. The insurance fund, which amounts to only $5,000, was created to provide a depository for periodic grants by the underwriter of the group life insurance program of the Association.

By comparing the audit reports of 1937 and 1947 it is possible to obtain a good understanding of the growth in membership, activities and assets during the past decade. Ten years ago the net assets of the Association were $971,651.13. Last July they were $1,904,494.72. Since 1937 the general fund has grown from 33.8 per cent to 53.0 per cent of the net assets of the Association. As of July 1 the general fund amounted to $1,007,000, slightly more than the total assets of the Association in 1937. Ten years ago THE JOURNAL fund represented 20.5 per cent of the net assets of the Association as compared to 10.5 per cent in 1947. From a percentage standpoint the relief fund has decreased during the past ten years from 41.3 per cent to 34.4 per cent of the net assets.

Ninety-eight per cent of the income of the Association comes from four main sources: dues, advertising and subscriptions for THE JOURNAL, advertising and subscriptions for the *Journal of Oral Surgery* and investments. During the past decade the annual income of the Association has increased from $308,904.28 to $682,214.64. In 1937 the membership dues accounted for 55.7 per cent of the income of the Association. In 1947 this source of revenue had increased to 58.8 per cent, or approximately $400,000. Ten years ago 22.8 per cent of the income of the Association was derived from advertising and subscriptions. As of last July 1 this source of revenue had increased to 27.8 per cent of the total income, or $210,000. Income from investments during the fiscal year 1946-1947 amounted to $60,000, or 8.5 per cent of the total income as compared to 6.5 per cent in 1937.

As would be expected, the operating expenses of the Association also have increased during the past ten years. Each year, activities have been expanded and new services have been requested by members. Rising prices have added their share to the increased costs. In 1937 the expenses of the Association were $251,327.72 as compared to $757,075.92 in 1947. A comparative percentage analysis of the expenses of the Association during the past decade shows that the expense of the central office has increased from 26.7 per cent of the total expenditure to 38.7 per cent. Expense of THE JOURNAL decreased from 44.2 per cent in 1937 to 38.2 per cent in 1947. Committee expense decreased from 16.2 per cent of the total expenditures of the Association in 1937 to 15.2 per cent as of July 1, 1947.

For years the Association has expanded its services as widely as its resources would permit. In order to maintain many of its activities, in the face of rising prices, the Association has drawn on its reserves during the past two years. Although this policy has not affected seriously the financial position of the organization, it is obvious that the Association cannot operate indefinitely on a deficiency budget. The auditor's report shows clearly that the financial position of the Association is sound. However, it also shows that the Association must curtail services and decrease expenses in order to function on a reasonably sound basis.

A. D. A. AFFAIRS

LOUIS M. CRUTTENDEN BECOMES A.D.A. ASSISTANT SECRETARY

Louis M. Cruttenden of St. Paul has been appointed assistant secretary of the American Dental Association. He will assume his new position on December 1.

Dr. Cruttenden was born in Northfield, Minn., on July 18, 1894, and received his early education in that city. After his graduation from the College of Dentistry, University of Minnesota, in 1916, he became associated with his father, the late Henry L. Cruttenden, in the practice of dentistry in Northfield. During World War I he served as a first lieutenant in the Dental Corps of the Rainbow Division. On his return from military service he re-entered practice in Northfield, and then moved to St. Paul in 1923. He served as chief of the dental sections of Miller Clinic and Shriner Hospital for Crippled Children, Minneapolis, and was a member of the attending staff at Ancker and Miller Hospitals in St. Paul.

He served on the executive council of the St. Paul District Dental Society and in 1930 was elected president of that society. He was elected secretary of the Minnesota State Dental Association in 1931 and served in that capacity until now. He has served as a delegate from the Minnesota State Dental Association to the House of Delegates of the American Dental Association almost continuously since 1933. He was secretary of the Conference of State Dental Society Officers in 1946 and was president of that organization in 1947.

Dr. Cruttenden's experience in dental society work and his knowledge of the affairs of the American Dental Association qualify him for this new position with the Association.

Louis M. Cruttenden, St. Paul, newly appointed assistant secretary of the American Dental Association

A. D. A. NOW OFFERS REGULAR CLIPSHEET SERVICE

Publication of the *A. D. A. Clipsheet*, which has been issued intermittently during the past two years, has been started on a schedule of regular two month intervals by the Bureau of Public Information of the American Dental Association.

The *Clipsheet* is distributed without charge as a public service to about 2,500 editors of house organs and trade magazines and to dental health workers throughout the nation. It features news stories, one paragraph items and cartoons concerning dentistry and dental health. Emphasis is placed on basic information on dental health for factory and office workers.

Copies of the *Clipsheet* may be secured free upon request.

DENTAL SOCIETIES

CHILDREN'S DENTAL HEALTH WEEK TO BE OBSERVED IN OHIO

The Akron Dental Society plans to observe its eighth annual Children's Dental Health Week during the first week in February 1948. This event was founded by L. A. Graham, past president of the society. It is anticipated that, as in former years, the observance of the week will be proclaimed by the Hon. Thomas Herbert, governor of Ohio, and the mayors of towns and cities in the district.

The president of the society, T. H. Schmidt, has appointed G. S. Hildreth, past president, as chairman of the committee for Children's Dental Health Week. The first committee meeting was attended by representatives of school and civic organizations who will assist in planning and presenting the program.

Ralph L. Ireland, professor of pedodontics at the College of Dentistry, University of Nebraska, will hold a clinic on dentistry for children on the afternoon of February 4, and also will speak at meetings and on radio broadcasts.

Other features of the observance will be poster contests, displays, films and discussions on dental health for school children, lectures to parent-teacher and other service organizations and newspaper publicity.

The Akron society has printed attractive brochures of American Dental Association material for children's dental education and has placed them in the public library and in many schools.

COMPONENT SOCIETY SECRETARIES HOLD SECOND ANNUAL MEETING

The American Association of Component Dental Executive Secretaries held its second annual meeting in Detroit on September 7, with the Detroit District Dental Society acting as host. A constitution and bylaws were adopted, and the following officers were elected: Clara C. Hegenbarth, Milwaukee, president; Florence Turgeon, Buffalo, vice-presi-

Members of the Akron Dental Society pause during plans for Children's Dental Health Week to chat with a young friend. Left to right: T. H. Schmidt, Kent, president of the society; G. S. Hildreth, Akron, chairman of Children's Dental Health Week; Joseph Fanelly, and L. A. Graham, Akron, founder of Children's Dental Health Week

dent, and Denzil C. Barnhill, Indianapolis, secretary-treasurer. Directors of the association are Leone Gruelich, Cleveland; Helen C. Allen, Detroit; L. Russell Hegland, Chicago, and P. H. McMullen, Cincinnati.

LATEST DENTAL SOCIETY ACTIVITIES AND MEETINGS

Michigan.—The Northern Dental Club will sponsor the regular meeting of the Detroit District Dental Society on December 9. The program includes an afternoon clinic, a dinner and a talk by Marvin Chapin on "Oral Surgery for the General Practitioner."

Ohio.—The Cincinnati Dental Society March Clinic Meeting and Children's Dental Health Day will be held March 14-16 at the Netherland Plaza Hotel.

Oregon.—The Oregon State Dental Association has opened a new temporary office for its secretary-treasurer, Willard H. Hurley, at 407 Selling Bldg., Portland. Services such as letter writing and mimeographing are available to all members, and facilities are offered for committee meetings.

The approval of all malpractice and health and accident insurance and of participating dentists for the Veterans Administration is taken care of in the new office.

Washington.—The annual meeting of the Washington State Dental Association and the Seattle District Mid-Winter Clinic will be held at the Olympic Hotel in Seattle, January 29-31.

INTERNATIONAL

ALL INDIA DENTAL CONFERENCE TO BE HELD IN FEBRUARY

The Third All India Dental Conference will be held February 19-22 in Bombay.

The reception committee has invited the members of the American Dental Association to attend the conference and to read scientific papers or contribute displays of new types of dental work. Two exhibit sections are planned, one for the delegates and one for the public.

Communications should be sent by insured mail to the Organizing Secretary, Reception Committee, All India Dental Conference 1948, Sambava Chambers, Sir Phirozshah Mehta Rd., Bombay 1, India.

ODONTOLOGICAL ASSOCIATION TO MEET IN DECEMBER

The eleventh annual dinner meeting of the Pan American Odontological Association will be held at the Hotel Pennsylvania in New York on Wednesday evening, December 10, at seven o'clock.

Members and professional colleagues are invited to attend. Reservations may be made by writing to Ralph Howard Brodsky, Executive-Secretary, 14 East Eighty-First St., New York 28.

DENTAL SCHOOLS

C. O. DUMMETT NAMED DEAN OF MEHARRY SCHOOL OF DENTISTRY

The board of trustees and the administration of Meharry Medical College have announced the appointment of Clifton O. Dummett as full time dean of the School of Dentistry.

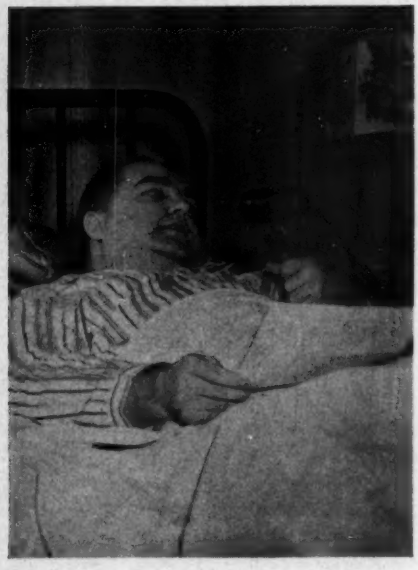
Dr. Dummett at 28 years of age is possibly the youngest dean in America. With a B.S. degree from Howard University and Y.M.C.A. Colleges, he entered the Dental School of Northwestern University from which he received the D.D.S. degree in 1941. He was awarded the degree of M.S.D. in periodontia at Northwestern in 1942 and joined the Meharry faculty the same year as instructor in periodontia. He rose quickly through the faculty ranks and was ele-

vated to the position of full professor and dean at the annual meeting of the Meharry trustees in June 1947. During the same month he received the M.P.H. degree from the University of Michigan where he had spent the year on a Rosenwald Fellowship. In June 1946 he passed the examination of the specialty board in periodontia of the state of Tennessee.

Cooperating with Dr. Dummett in administration and external policy, the president of the college, M. Don Clawson, will continue to serve as director of dental education. Dr. Dummett will accept most of the responsibility of internal and academic administration.

L. W. BURKET, BEDRIDDEN, LECTURES BY TELEPHONE

Lester W. Burket, head of the department of oral medicine of the Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, has been teaching his classes by means of a special telephone circuit.



Lester W. Burket, University of Pennsylvania, lectures to his classes in oral medicine by means of a telephone circuit (photograph by courtesy of Evening Bulletin, *Philadelphia)*

Confined to his bed because of complications resulting from the fracture of a femur in an automobile accident a year ago, Dr. Burket was unwilling to interrupt his work. Last year two graduate students attended weekly classes at his bedside.

This fall a system using telephone lines was devised by Leon Levy, an alumnus of the dental school and general manager of Station WCAU, in conjunction with station engineers. Dr. Burket speaks into a microphone at his home in Bryn Mawr, and his words are carried by means of an amplifier and a special telephone line to the main Bryn Mawr line and thence to another amplifier and the loudspeaker in the classroom.

Gordon R. Winter, assistant professor of oral medicine, acts as proctor for the classes and gives examinations. A series of mimeographed diagrams replaces the usual blackboard illustrations.

NEW DEGREE COURSES ANNOUNCED BY WASHINGTON UNIVERSITY

The School of Dentistry, Washington University, has announced its formal entry into the field of graduate education. Persons matriculating for graduate work must present two years of predental and four years of dental work with a satisfactory scholastic average and other evidence of ability and interest in a selected field of specialization.

Twenty-one months (two academic years and one summer term) will be required of those seeking the M.S. degree. The Ph.D. degree is offered to those with advanced qualifications.

Postgraduate courses are being offered in the following subjects: prosthetics (two weeks); radiodontics, diagnosis and treatment planning, anesthesia, and dentistry for children (one week each); pathology conferences, anatomy of head and neck, and casting technic (both

afternoon and evening sessions).

Those interested should communicate with the Registrar, School of Dentistry, Washington University, 4559 Scott Ave., St. Louis 10.

TUFTS COLLEGE ANNOUNCES COURSES IN PERIODONTOLOGY

Tufts College Dental School has announced the presentation of four postgraduate and graduate courses in periodontology.

Refresher Course I will be held each Monday for twelve weeks, beginning January 19. Refresher Course II will be held full time, June 7-18.

A sixteen week, full time course leading to a certificate, Postgraduate Course III, and a thirty-two week, full time course leading to the Master of Science degree for qualified students, Graduate Course IV, also are being offered.

Additional information may be obtained by writing to J. T. O'Rourke, Director, Division of Graduate and Postgraduate Studies, Tufts College Dental School, 416 Huntington Ave., Boston 15.

VETERANS

MILBURN M. FOWLER DIES OF HEART ATTACK

Milburn Matthew Fowler, aged 56, assistant medical director for dental service of the Veterans Administration, died October 27 of a heart attack at his home in Chevy Chase, Md.

Military funeral services were held October 29 in the chapel at Fort Myer, Va., and interment was in Arlington National Cemetery. Among those who attended the funeral were representatives of the armed forces and members of the District of Columbia Dental Society. C. Willard Camalier, assistant secretary of the American Dental Association, represented the Association as an honorary pallbearer.

Milburn Matthew Fowler, assistant medical director for dental service of the Veterans Administration, who died October 27

Dr. Fowler will long be remembered as a true friend to dentistry and one who administered the affairs of his office with great skill and understanding. His death is a distinct loss to an important governmental service, to dentistry and to his many friends.

A native of Skowhegan, Maine, Dr. Fowler was graduated from Tufts College Dental School and returned to Skowhegan to practice. He served on the Mexican border in 1916 with the Maine National Guard and was in Europe with the Twenty-Sixth Division during World War I.

Dr. Fowler went to Washington in 1920 for the Veterans Administration, where he served as assistant chief of dental service for twenty years and as chief for two years. When the department of medicine and surgery was created by the Veterans Administration in 1946, he became assistant medical director for dental service.

In conjunction with a committee of

the American Dental Association Dr. Fowler laid the plans and put into operation the program whereby thousands of private dentists throughout the country were appointed to give home town dental care to eligible veterans.

For many years he served in the House of Delegates of the American Dental Association. He was a member of the Fédération Dentaire Internationale, American College of Dentists, Association of Military Surgeons and numerous other organizations. He was a member of the Psi Omega fraternity and an honorary member of Omega Kappa Upsilon.

Dr. Fowler is survived by his widow; a son, James A. Fowler, Philadelphia; two daughters, Mrs. Nancy Morley, Buffalo, and Miss Mary Ann Fowler, Chevy Chase, and two grandchildren.

DENTAL VETERANS ORGANIZE NATIONAL LEAGUE

An organization tentatively named the National Dental Veterans League was founded in Boston on August 11. The aims of the organization are to aid the American Dental Association in the furtherance of legislative matters, especially those of a military nature, which are in the interests of organized dentistry; to promote the interests of dentistry in the armed forces; to improve dental service for military personnel, and to insist on administrative autonomy and parity for the Dental Corps.

The principal requirements for membership in the National Dental Veterans League are a record of honorable service in the Dental Corps of the Army or Navy and membership in good standing in the American Dental Association.

Officers of the organization are Robert T. Curren, Springfield, Ill., president; A. L. Linck, Los Angeles, vice-president; Emil H. Bollwerk, St. Louis, secretary, and William B. Cockroft, Memphis, Tenn., treasurer. Directors are Charles C. Welsch, Nokomis, Ill.; Leo F. Marré, St. Louis; G. D. Hampton, Abilene, Kan., and C. M. McEachern, Jackson, Miss.

FEDERAL AGENCIES

SURGICAL EQUIPMENT OFFERED BY WAR ASSETS ADMINISTRATION

Approximately 25,000 units of surplus unused autoclaves and sterilizers are being offered for sale at new, low, fixed prices, the War Assets Administration announced recently.

The property, of fifty-six types, ranges from small instrument sterilizers to large, hospital type batteries and is usable for sterilizing dressings, instruments, hypodermic needles and water.

Included in the sale are stationary, portable and field types, operated by electricity, by direct steam, by artificial or natural gas, by gasoline-fired burners and by alcohol-fired burners. Some types are of standard construction, with copper base alloy or stainless steel in vital parts, and others are of galvanized steel.

The new prices applying to these items range downward from less than half to as low as 11 per cent of acquisition costs. The prices are established for priority claimants, wholesalers and exporters and are subject to a 15 per cent markup to small retailers. Eligible nonprofit, tax-exempt institutions may purchase equipment at a discount of 95 per cent. All items are sold on an "as is, where is" basis.

Minimum purchase for priority groups is one of any item listed, with no maximum. Commercial orders must total $100 or more.

A list of all items of the sale, with descriptions, acquisition costs, new fixed prices and condition of sale, may be obtained from any Customer Service Center of the War Assets Administration, but all orders should be addressed to WAA Customer Service Center, Fourth St. and Jefferson Drive, S.W., Washington 25, D. C.

THIRTEEN PATENTS OF INTEREST TO DENTISTS ISSUED BETWEEN JULY 1 AND SEPTEMBER 30

		July 1
2,423,330	Charles Levine	Method of Making Dentures
		July 8
2,423,522	Albert Shmukler and Harry Bronstein	Articulator
		July 29
2,424,729	Juel L. Andreasen	Dentist's Mobile Equipment Unit
2,424,895	Stanley E. Noyes	Dental Impression Composition
2,424,906	James C. Sharrock and John A. Sheeley	Dental Press
		August 5
2,425,048	Milton Schlesinger	Adjustable Form for Making Dental Models
2,425,118	Stanley E. Noyes	Dental Impression Composition
		August 12
2,425,489	Ralph Gilbert Peterson	Anesthesia and Surgery Restraining Device
		August 26
2,426,286	Frank J. Stadler	Dental X-Ray Film Identifier
2,426,336	David J. Binus	Dental Chair and the Like
2,426,388	Browning O. Chartrand	Dental Impression Tray
		September 16
2,427,411	Max Krueger	Toothbrush With Adjustable Brush Head
		September 30
2,428,094	Louis Raymond	Arch-Shaped Mold for the Making of Custom-Made Prearranged Acrylic Teeth

ARMY AND NAVY

ARMY OFFERS FIFTY DENTAL INTERNSHIPS IN 1948

Fifty dental internships will be offered by the Army in 1948 to be filled by recent dental school graduates.

The internships will be for a period of one year of active duty. They will be rotating and will include the following services: x-ray and oral diagnosis, operative dentistry, oral surgery, periodontia and prosthetic dentistry.

Pay scales for interns as first lieutenants will be in accordance with existing regulations covering commissioned officers' pay and allowances. Credit for purpose of pay is given in accordance with length of military service. Subsistence and rental allowances are determined by the marital status of the intern; additional subsistence and rental pay is provided for officers with dependents.

Applicants must be citizens of the United States, graduates of approved dental schools (now completing fourth year of dental training) and not more than 30 years of age on July 1, 1947; must have made no agreement to accept an internship appointment in any other institution, and must meet the physical standards for appointment in the Dental Corps of the regular Army.

LACK OF DENTISTS LIMITS CARE FOR U. S. CIVILIANS OVERSEAS

The Navy has found that the inadequacy of dental personnel and facilities in oversea commands permits in general the furnishing of only emergency dental care to other than military personnel. Owing to this lack of dental personnel, all commanders issuing oversea orientation material to civilian employees and dependents have been directed by the War Department to include instructions that all necessary dental attention should be completed prior to embarkation.

NAVY DENTAL SCHOOL AWARDS POSTGRADUATE CERTIFICATES

Graduation exercises for sixteen Dental Corps officers attending the postgraduate course at the Naval Dental School, Bethesda, Md., were held October 3 at the Medical Center. Capt. Clemens V. Rault, commanding officer of the school, presided.

The program included addresses by Rear Admiral Alfred W. Chandler, assistant chief of the Bureau of Medicine and Surgery for dentistry; John P. Burke, dean of the School of Dentistry, Georgetown University, and Rear Admiral H. L. Pugh, deputy and assistant chief of the Bureau of Medicine and Surgery.

Ten of the officers who completed the six months of intensive instruction received a general postgraduate course, three received specialized training in oral surgery and three were trained in dental prosthesis.

Certificates were awarded by Admiral Pugh to Cmdr. L. F. Abel, Shelbyville, Ind.; Lieut. (jg) R. A. Anderson, Chicago; Cmdr. M. C. Craig, Leigh, Neb.; Lieut. J. F. Flood, Wyomissing, Pa.; Cmdr. A. R. Frechette, Hollywood, Calif.; Cmdr. W. H. Hartnett, Philadelphia; Lt. Cmdr. B. F. Haymes, Dewey, Okla.; Cmdr. J. A. Hogan, Philadelphia; Cmdr. J. E. Krieger, Los Angeles; Cmdr. W. B. Lett, Huntington, W. Va.; Cmdr. J. F. Link, Dubuque, Iowa; Cmdr. H. K. Muth, San Diego, Calif.; Cmdr. G. O. Stead, New London, Conn.; Cmdr. J. B. Stoll, Perham, Minn.; Lt. Cmdr. E. B. Tharp, Chicago, and Cmdr. K. O. Turner, Wheaton, Ill.

PUBLIC HEALTH

GEORGE A. NEVITT RECEIVES APPOINTMENT IN VIRGINIA

George A. Nevitt, Louisville, Ky., has been appointed director of the division of mouth hygiene of the Virginia Health Department. He is on loan from the United States Public Health Service, to fill the vacancy left by the death of N. Talley Ballou.

Dr. Nevitt is a graduate of the School of Dentistry, University of Louisville. He received the M.S. degree from the University of Kentucky and the doctor's degree in public health from the University of Michigan.

He became dental director of the Kentucky Health Department in 1937, and in the recent war he served for a time as dental consultant for UNRRA in Europe and the Middle East.

COLUMBUS DENTAL CLINIC FACILITIES ARE EXPANDED

The Department of Health of Columbus, Ohio, has installed a second complete unit in its city hall dental clinic in order to equip a second dentist for its clinic staff. The expansion of the dental program has been arranged in cooperation with the Columbus Dental Society, the State Health Department and the College of Dentistry of the Ohio State University.

Clinic services, offered particularly to preschool children, include free dental examinations and advice.

PENNSYLVANIA STUDIES DENTAL HEALTH OF WORKERS

The bureau of industrial hygiene of the Pennsylvania State Department of Health has inaugurated a study of the dental health of industrial workers in the state. The first phase of the study will comprise a dental survey of a group of basically different industries in the Philadelphia area using chemicals and materials believed to be responsible for occupational dental diseases. The program has been approved by the council on dental health of the Pennsylvania State Dental Society.

E. R. Aston, dental consultant for the bureau of industrial hygiene, will conduct the study. He said that the program is designed to provide information concerning the dental health of workers in various industries and in different age groups and to determine whether there are any hazards affecting the teeth and oral tissues in the industries surveyed. Recommendations will be made to eliminate or control any hazards that may be found.

Dr. Aston has been supplied with portable equipment for the work, and will be assisted by a nurse, an x-ray technician and clerical help.

R. R. SAYERS NAMED TO MINE WORKERS' MEDICAL BOARD

R. R. Sayers, medical director of the United States Public Health Service and director of the United States Bureau of Mines since 1940, has been granted leave without pay to accept the chairmanship of the medical board established in July by the Trustees of the Welfare and Retirement Fund of the United Mine Workers of America.

His appointment was recently announced by Thomas Parran, Surgeon General, United States Public Health Service. Assignment of Dr. Sayers to this position is in line with the Public Health Service policy of making expert personnel available to official and voluntary non-profit organizations to assist in the developmental stages of new and significant undertakings.

In his new position, Dr. Sayers will advise trustees of the miners' fund on health and medical problems. He will also assist state and local public health authorities, as well as coal mine operators and unions, in carrying out recommendations contained in the *Medical Survey of the Bituminous Coal Industry* issued last spring by Rear Admiral Joel T. Boone. This survey, provided for by the Lewis-Krug agreement when the government was operating the mines, is the first nationwide report on living and working conditions of the miners.

A.M.A. HOLDS SCHOOL HEALTH CONFERENCE

A three day Conference on the Cooperation of the Physician in the School Health and Physical Education Program, sponsored by the American Medical Association, was held in October in Highland Park, Ill. More than 100 representatives attended from state departments of education, state departments of health, state education associations and state medical societies. The American Dental Association was represented by Lon W. Morrey, editor of THE JOURNAL.

Discussions were held on school health services, school health programs and studies, the physician and physical education, and pre-service and in-service education.

The conference advocated that every school establish workable policies to assure its pupils of healthful school living conditions, appropriate health and safety instruction and adequate or superior education. It especially recommended that teachers and other school personnel be furnished with up-to-date preparation in health knowledge. The leaders agreed that school health policies must be for-

mulated to achieve the maximum cooperation and coordination both within each school and each school system and between each school and the community.

Edward L. Bortz, president of the American Medical Association, said in a speech delivered at the conference, "A clarification of our national needs, supported by a modern program of instruction in health and the democratic way of life, is the surest guarantee for the nation's security. The development of such a program, to my mind, is the most important educational task which is facing our nation today."

NATIONAL CANCER INSTITUTE PLANS AID TO MEDICAL SCHOOLS

The National Cancer Institute is now prepared to give aid to medical schools for further development of courses in cancer for medical students, Thomas Parran, Surgeon General of the United States Public Health Service, announced recently. He added that plans are under way to inaugurate a similar plan in dental schools in the near future.

For the first time the Institute received authority from Congress this year to make grants-in-aid to medical schools for this purpose. Previously all grants have been for the support of research work on cancer.

This new activity of the National Cancer Institute is being inaugurated on the recommendation of the National Advisory Cancer Council, which in turn based its recommendations on the results of a conference on cancer in the medical school curriculum, held at the Institute by a committee of medical educators.

Dr. Parran stated that the new program of aid to schools is designed to place greater emphasis on the integration of cancer instruction in the total undergraduate curriculum.

Grants will range from $10,000 to $25,000 a year depending on the activities to be undertaken. Under provisions of the Appropriation Act that authorized this program, funds granted each year are available until spent.

CANCER PREVENTION-DETECTION CLINIC OPENS IN NEW YORK

The first clinic for the prevention and detection of cancer to be operated by the New York City Department of Health was opened on October 15 with a brief ceremony.

Speakers at the exercises in the Kips Bay-Yorkville Health Center, where the new clinic has been established, included Deputy Mayor John J. Bennett, Commissioner of Health Israel Weinstein and Wilson G. Smillie, professor of public health and preventive medicine at the Cornell University Medical College.

The project has been undertaken on a cooperative basis by the City Health Department, the New York City Cancer Committee, Cornell University Medical College and the Strang Cancer Prevention Clinic of Memorial Hospital. It will be under the direction of Emerson Day, assistant professor of public health and preventive medicine at Cornell Medical College.

GENERAL NEWS

SCIENCE MEETING TO BE HELD IN CHICAGO DECEMBER 26-31

The one hundred fourteenth meeting of the American Association for the Advancement of Science will be held December 26-31, with general headquarters at the Sherman Hotel in Chicago. The subsection on dentistry will meet at the hotel on December 28.

The registration fee is $2 for members of the association and nonmember students and $3 for other nonmembers. Conventioners may register in advance of the meeting and obtain a copy of the

general program during the first week in December by mailing the registration fee to the American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington 5, D. C.

Hotel accommodations may be secured immediately by writing to the American Association for the Advancement of Science Reservation Center, Chicago Convention Bureau, 33 North LaSalle St., Chicago 2. The exact dates of arrival and departure should be supplied with the request.

NEW ORAL SURGERY INTERNSHIP AVAILABLE IN PENNSYLVANIA

The Department of Oral and Maxillofacial Surgery of the George F. Geisinger Memorial Hospital has announced that it will accept a recent graduate for internship in oral surgery on July 1, 1948.

This service consists of a two year period of training in major and minor oral surgery exclusively, leading to a diploma from the hospital at the end of the second year.

The remuneration is $20 a month plus maintenance and laundry.

Further information may be obtained from Dr. James B. Smith, George F. Geisinger Memorial Hospital, Danville, Pa.

LAWRENCE VAN KIRK APPOINTED TO PITTSBURGH SCHOOL BOARD

Lawrence Van Kirk, dean of the School of Dentistry, University of Pittsburgh, has been appointed to a six year term on the Board of Education of Pittsburgh. The appointment became effective on November 10.

Dr. Van Kirk, an honor graduate of the University of Pittsburgh dental school, is a member of the International Association for Dental Research and has served for many years as editor of the Pittsburgh section of the association. He organized the dental department of the Presbyterian Hospital, Pittsburgh, and is chief of staff of that department. He is a fellow of the American College of Dentists and a member of the American Association of Dental Editors.

Lawrence Van Kirk, dean of the School of Dentistry, University of Pittsburgh, who recently was appointed to the Board of Education in Pittsburgh

Dean Van Kirk recently was elected to the board of trustees of the tenth district of the Pennsylvania State Dental Society. He served as president of the Odontological Society of Western Pennsylvania during 1946, and is chairman of the law enforcement committee and a member of the committee on dental education of that society.

In November of the past year Chancellor Rufus H. Fitzgerald appointed Dr. Van Kirk as chairman of a committee to recommend a long range policy for the School of Dentistry, University of Pittsburgh. In July of this year, Dr. Van Kirk was appointed to his present position as dean of the school.

DENTAL OFFICE EQUIPMENT STOLEN IN FOREST HILLS

The office of Max M. Bergholz in Forest Hills, N. Y., was entered by means of a pass key or skeleton key on September 28, and the following articles were removed: a new Ritter lathe, serial No. 5C37509; a Bausch & Lomb microscope, model HA-8, serial No. 258339; a 16 mm. objective lens, No. 14805; a 4 mm. objective lens, No. 26971; a 1.8 mm. objective lens, No. 23866; a Garhart amalgam dispenser, and 1,000 codeine sulfate tablets, ¼ grain.

Anyone who has information concerning these articles is requested to write to Dr. Bergholz, 69—108th St., Forest Hills, N. Y.

AID SOUGHT IN IDENTIFYING BODY TAKEN FROM LAKE ONTARIO

The Scientific Laboratory of the New York State Troopers, Division of State Police, has requested the aid of the American Dental Association in an effort to identify a white man whose nude body was removed from Lake Ontario, Oswego County, New York, on May 3. The body apparently had been in the water for about three months.

The man was 50 to 60 years of age, gray-haired and 6 feet 2 inches in height and weighed 200 to 220 pounds. He was well built, with well shaped arms, but was lacking in muscles which normally would be expected in a man of his size. A scar on the lower part of the right side, with a suture of kangaroo tendon, is believed to have been the result of a recent operation for hernia or hydrocele.

Portion of right side of lower jawbone and teeth from body found in Lake Ontario

The teeth present in the upper jaw are a left cuspid with a large gold foil filling and a distal amalgam filling, the left first bicuspid and a molar. The lower jaw contains the right lateral incisor, the right cuspid and the right second bicuspid, on which is a gold shell crown with a large solder repair on the distal surface.

Any dentist who may recognize the description or the picture of the teeth is asked to contact William E. Kirwan, Director, Scientific Laboratory, New York State Troopers, 545 Broadway, Albany 7.

NEW HOSPITAL COUNCIL MEMBERS ARE NAMED

Three new members of the Federal Hospital Council, established last year to assist Surgeon General Thomas Parran of the U. S. Public Health Service in the administration of the hospital survey and construction program, have been announced by Oscar R. Ewing, federal security administrator.

Nelson Cruikshank, director of social insurance activities of the American Federation of Labor, Washington, D. C., was appointed to fill the unexpired term of Clinton S. Golden, who resigned to serve as labor adviser to the American Mission for Aid to Greece.

James A. Paullin, professor of clinical medicine, Emory University, Atlanta, Ga., and former president of the American Medical Association and American College of Physicians, will succeed Mrs. Evelyn Hicks, whose term has expired.

Joseph W. Fichter, master of the Ohio State Grange, Columbus, Ohio, will succeed Melville G. Broughton, whose appointment also has expired.

REPORTS OF

COUNCILS AND COMMITTEES

COUNCIL ON DENTAL THERAPEUTICS

COUNCIL ANNOUNCES ACCEPTANCE OF PENICILLIN-C.S.C. PEANUT OIL-BEESWAX MIXTURE

THE Council on Dental Therapeutics of the American Dental Association announces the acceptance of the following product:

Penicillin-C.S.C. Peanut Oil-Beeswax Mixture: This product is prepared by physically mixing 110 gm. of crystalline potassium penicillin (potency near 1,600 units per milligram) with 500 cc. of peanut oil-beeswax mixture containing 4.8 per cent (w/v) beeswax. This yields 550 cc. of finished peanut oil-beeswax mixture with a penicillin potency of approximately 320,000 units per cubic centimeter. This preparation is white-gray in color, odorless and tasteless and is in a solid state at room temperature. It is liquefied for injection by heating to 45 C. by immersion in boiling water for two to three minutes.

The pharmacologic action and therapeutic indications for this product are those of crystalline potassium penicillin. It is supplied in 10 cc. vials of the rubber-stoppered serum type, the stopper being protected by a removable metal cap. The average dose is 1 cc. by intramuscular injection.

It is claimed that the penicillin peanut oil-beeswax preparation is more slowly absorbed from the site of injection than is penicillin in physiologic salt solution and consequently that adequately effective therapeutic blood levels can be maintained for from twelve to twenty-four hours after one injection. Rather extensive data have been presented in support of this claim.

Manufactured by Commercial Solvents Corporation, Terre Haute, Ind.

THE PRESENT STATUS OF PENICILLIN FOR ORAL ADMINISTRATION

IN CONNECTION with its announcement that penicillin for oral administration has been accepted for inclusion in Accepted Dental Remedies, the Council on Dental Therapeutics feels that it is desirable to point out that products of this type are not cure-alls and have definite limitations as to indications and effectiveness. The products referred to include the several forms of buffered tablets which are given by mouth to produce a therapeutically effective level of

penicillin in the blood. Obviously the effectiveness of penicillin given orally is limited to those infections which are caused by penicillin-sensitive organisms, and attempts to treat infections which do not fall into this group with any form of penicillin can result only in failure. For this reason any dentist who proposes to use penicillin in any form must familiarize himself thoroughly with the types of infections which are sensitive and resistant to it.

In addition, penicillin administered by mouth is limited in its usefulness by the fact that absorption from the gastro-intestinal tract is variable from person to person and from time to time in the same person. Absorption is poor if the penicillin becomes mixed with acid and food in the stomach. Therefore, penicillin administered orally must be given at least one-half hour before a meal and not sooner than one and one-half hours after a meal. Since only a small portion of the penicillin administered by mouth ever reaches the blood stream, at least four to five times the parenteral dose must be given. This usually means a minimum of 100,000 units every three hours, day and night.

The extent to which organisms may be made penicillin resistant by exposure to sublethal doses of penicillin is still controversial. Since there seems to be a possibility of producing penicillin-resistant organisms in this way, penicillin should be used only when definite indications exist for its effective application. This is particularly true in the case of the oral administration of penicillin because of the variability in absorption rates mentioned above.

At the present time it is not considered good practice to attempt the treatment of fulminating and dangerous infections with oral administration of penicillin. If possible, patients suffering from such infections which are caused by penicillin-sensitive organisms should be hospitalized and treated by the usual intramuscular route. If hospitalization is not possible and intramuscular injections of penicillin cannot be given every three hours, the injection, once or twice daily, of 300,000 units of penicillin in peanut oil and beeswax (Romansky formula) will be more reliable than administration of penicillin by the oral route. After the acute symptoms have subsided, penicillin may be given orally for continuing treatment until recovery is complete.

Penicillin given by mouth would appear to have a useful place in dentistry for prophylaxis against secondary infections after tooth extractions, apicoectomies and other surgical procedures if existing infection, extensive pathosis or severe trauma might predispose the patient to secondary infection. However, there would appear to be no logical reason for the oral administration of penicillin prophylactically in cases of simple, uncomplicated extractions. Currently available evidence does not indicate that penicillin administered orally is as satisfactory for adjunctive use in the treatment of Vincent's infection of the mouth as is penicillin administered topically.

Penicillin given orally also is being used experimentally for prophylactic purposes before and after tooth extraction in persons with damaged heart valves, as a precaution against the onset of subacute bacterial endocarditis. Preliminary work indicates that penicillin is very effective for this purpose, but pending further extensive studies the optimum route and dosage of penicillin are not established. It seems possible that parenteral administration will prove most reliable, but, if that route cannot be used, the dentist may prescribe oral administration of penicillin preoperatively and postoperatively after the diagnosis of a heart lesion has been established and prophylactic treatment has been recommended by a physician. Good clinical judgment would indicate that oral ad-

ministration of penicillin should be prescribed preoperatively for twelve to twenty-four hours and postoperatively for twenty-four to forty-eight hours.

No presently available data indicate that the oral administration of penicillin in the treatment of uncomplicated root canal and periapical infections is of value.

If used rationally and conservatively on the basis of its known values and limitations, penicillin given by mouth will serve a useful purpose in dentistry. Its use should be limited to those instances in which it has known value because of the danger to the patient of inadequate treatment of dangerous infections.

Penicillin Tablets (Oral) 25,000 units-Bristol: Each tablet is stated to contain penicillin calcium, 25,000 units; calcium carbonate, 0.513 gm.; starch, 0.026 gm.; magnesium stearate, 0.007 to 0.010 gm. In vials of 12.

Penicillin Tablets (Oral) 50,000 units-Bristol: Each tablet is stated to contain penicillin calcium, 50,000 units; calcium carbonate, 0.513 gm.; starch, 0.026 gm.; magnesium stearate, 0.007 to 0.010 gm. In vials of 12. Manufactured by Bristol Laboratories, Inc., Syracuse, N. Y.

Tablets Buffered Penicillin, 50,000 units-C.S.C.: Each tablet is stated to contain crystalline potassium penicillin G, 50,000 units; hydrogenated soy bean oil, 0.092 gm.; sodium oleate, 0.015 gm.; sodium stearate, 0.164 gm., and starch, 0.019 gm. In vials of 8 or 48.

Tablets Buffered Penicillin, 100,000 units-C.S.C.: Each tablet is stated to contain crystalline potassium penicillin G, 100,000 units; hydrogenated soy bean oil, 0.092 gm.; sodium oleate, 0.015 gm.; sodium stearate, 0.164 gm.; and starch, 0.019 gm. In vials of 8 or 48. Manufactured by Commercial Solvents Corporation, Terre Haute, Ind.

Penicillin Tablets (Buffered) 50,000 units-Schenley: Each tablet is stated to contain penicillin calcium, 50,000 units, in a mixture which consists of calcium carbonate, 80 per cent; sucrose, 10 per cent, and starch, 10 per cent. In bottles of 12. Manufactured by Schenley Laboratories, Inc., New York.

COUNCIL LISTS PRODUCTS FOR "ACCEPTED DENTAL REMEDIES"

THE Council on Dental Therapeutics of the American Dental Association announces the inclusion of the following products in the list of Accepted Dental Remedies:

Penicillin and Streptomycin[1]

Penicillin Sodium Salt-Abbott, in vials containing 1,000,000 units. Manufactured by Abbott Laboratories, North Chicago, Ill.

Crystalline Penicillin G (Sodium Salt)-Abbott, in vials containing 100,000 units, 200,000 units, 500,000 units and 1,000,000 units. Manufactured by Abbott Laboratories, North Chicago, Ill.

Crystalline Sodium Penicillin G-Bristol, in vials containing 100,000 units, 200,000 units, 500,000 units and 1,000,000 units. Manufactured by Bristol Laboratories, New York.

Anesthetics—Local—Slightly Soluble[2]

Benzocaine Solution-Neo-Quest: Each

1. A.D.R., Ed. 13, p. 104.

2. A.D.R., Ed. 13, p. 69.

100 cc. is stated to contain benzocaine, 10 gm., in propylene glycol with cinnamic aldehyde, 0.11 gm.; oil of cloves, 0.055 gm., and certified color. Manufactured by Neo-Quest Chemical Company, Inc., Philadelphia.

Anesthetics—Local[3]

Procaine HCl 2%, Epinephrine 1: 50,000-Holtz Brand: Each cubic centimeter is stated to contain procaine hydrochloride, 0.02 gm.; epinephrine, 0.00002 gm.; sodium chloride, 0.005 gm., and sodium bisulfite, 0.0019 gm., in distilled water. Marketed in 2.3 cc. cartridges. Manufactured by the Holtz Chemical Company, Philadelphia.

Procaine HCl 2%, Epinephrine 1: 50,000-Anestex: Each cubic centimeter is stated to contain procaine hydrochloride, 0.02 gm.; synthetic epinephrine bitartrate (as base), 0.00002 gm.; chlorobutanol, 0.005 gm.; sodium chloride, 0.0005 gm.; potassium sulfate, 0.003 gm.; sodium thiosulfate (anhydrous), 0.001 gm., and sodium bisulfite, 0.00067 gm., in distilled water. Marketed in 2.4 cc. Injectubes. Manufactured by the Anestex Laboratories, Pittsburgh.

Admission of a product to the list of Accepted Dental Remedies means that the product and the methods by which it was marketed at the time of consideration were not found to be in violation of the Council's published rules. Accepted products are reconsidered periodically. The files of the Council contain information on many drugs and dental cosmetics which is available upon request, and inquiries are welcomed.—*Donald A. Wallace, Secretary.*

3. A.D.R., Ed. 13, p. 48.

ERROR IN REPORT ON STATUS OF SULFATHIAZOLE GUM

Alexander B. MacGregor of London has called the attention of the Council to an error in the Council's report on the present status of sulfathiazole gum, which was published in the May 15, 1947, issue of THE JOURNAL, pages 700-703. In this report the following statement was made: "MacGregor and Long,[1] reporting on 75 patients with Vincent's stomatitis who were treated with penicillin pastilles, state that all patients became asymptomatic in twenty-four hours, sloughs and signs of acute inflammation in the gums disappeared within forty-eight hours and in no instance was treatment necessary after forty-eight hours."

The concluding clause of this statement should have read: ". . . and in no instance was treatment necessary after five days." It is hoped that the error will not give the impression that the average case of Vincent's stomatitis can be cured by treatment with penicillin in the short space of forty-eight hours or that treatment with penicillin alone is adequate. Although penicillin may be of value as an adjunct, the usual correction of all local and systemic predisposing factors must be carried out if a complete cure is to be obtained.

1. MacGregor, A. B., and Long, D. A., Penicillin Pastilles in the Treatment of Acute Ulcerative Gingivo-Stomatitis (Vincent's Type). *Brit. D. J.* 78:33 (January 19) 1945.

COMMITTEE ON LEGISLATION

DECISIONS OF THE COURTS ON PICKETING OF DENTAL OFFICES BY UNIONS

THERE have been several cases in the New York courts involving the right of a union of dental technicians to picket the office of a dentist who patronizes a dental laboratory while a strike is in progress.

So far, two points of law have been discussed extensively in the decisions of the courts. One point arises out of the legal concept of "unity of interest" in a labor dispute. Under this concept the dental technicians' union claims that there is a "unity of interest" between a dentist and a dental laboratory which gives the union the right to have pickets carry placards in front of a dentist's office stating that the dentist is patronizing a dental laboratory during a strike. Another point arises out of the right given to labor unions in the law of New York to give publicity to the existence of a labor dispute. The courts in New York have handed down conflicting decisions, so that considerable confusion has arisen as to just what the law is in any given case.

A review of an early labor law case, which is referred to in all of the dental cases, will give a fairly clear explanation of the law and the reasoning which the courts followed in the later cases.

Goldfinger v. Feintuch

The early case is Goldfinger v. Feintuch (276 N.Y. 281), decided in 1937 by the highest court in the state of New York. This case arose out of a strike at the plant of a manufacturer of meat products. The butchers' union had endeavored to obtain a union agreement with the employer but had been unsuccessful. Thereupon the union began to picket the retail stores selling the nonunion products, and one of the retailers sought an injunction to stop the picketing of his store.

In its decision the court held that although it is illegal to picket the place of business of someone who is not a party to a labor dispute for the purpose of coercing the owner of the business to take sides in a controversy in which he has no interest, peaceful picketing may be carried on not only against the employer but also against a *nonunion product* sold by a person who is in unity of interest with the employer and who is in the same business for profit. Thus, a union may, in a proper manner and in a peaceful way, ask the public to refrain from purchasing products made by nonunion labor and state where these products are sold. There is a unity of interest between the manufacturer who makes the nonunion product and the retailer who sells it which gives the union the right to picket the retailer's store even though the union does not have any other dispute with the retailer.

Back v. Kaufman

The case of Back v. Kaufman (22 N.Y.S. 2d 449), decided in 1940, was the first case involving the picketing of a dentist's office. A dental technicians' union was striking against a dental laboratory, which it was seeking to unionize, and requested the plaintiff dentist to cease purchasing from the laboratory. On the dentist's refusal to comply with the

union's demand, the union began to picket his office. The dentist sought an injunction to restrain the picketing, asserting that there was no labor dispute between himself and the union since he employed no help other than one female office assistant. The union claimed the right to picket on the ground that the unity of interest between the dental laboratory and the dentist justified its pickets in notifying the general public that the dentist was offering for sale a nonunion product.

The court held as follows:

While Goldfinger v. Feintuch is authority to the effect that "where a retailer is in unity of interest with the manufacturer, the union may follow the non-union goods and seek by peaceful picketing to persuade the consuming public to refrain from purchasing the non-union product," yet subsequent attempts to extend this doctrine to those other than retailers have invariably been rejected by the courts. In the matter under consideration it would require considerable stretching of the imagination to bring the plaintiff within the rule as a retailer. He sells no product identifiable by trade name, but, rather, has constructed at his personal direction various appliances, each individual and distinctive, for use by him as an incident to his calling as a professional man in the rendition of skilled services for compensation. The unity of interest necessary to permit defendant the right to picket is lacking and the court holds that the conduct complained of is a true secondary boycott and an unlawful interference with the business of the plaintiff which should be enjoined.

Jacobs v. Eisen

The next dental case was Jacobs v. Eisen (68 N.Y.S. 2d 921). The lower court decided on January 14, 1947, in favor of the union, but the appellate court completely reversed this decision on June 30, 1947, and held in favor of the dentists.

In this case the dental technicians' union, known as Dental Technicians Equity, C.I.O., was striking against the H. Brand Laboratory, Inc., located in Far Rockaway, Queens County, N. Y. The union was picketing the offices of four dentists in Far Rockaway, claiming that they were patronizing the laboratory while a strike was in progress. No member of the union was employed by any of the four dentists nor did any of the four dentists employ a dental mechanic or technician or any other person to do dental laboratory work. The union pickets carried signs of which the following is typical: "H. Brand Laboratories on strike. Dr. Jacobs' office supplies dentures made by struck laboratory. Help Us Win. Dental Technicians Equity, Chapter 201 F.A.E. C.T., U.O.P.W.A., C.I.O." The factual statement on the signs was true. The dentists sought to enjoin the picketing of their offices on the ground that there was no labor dispute between themselves and the union.

The lower court refused to issue an injunction, saying:

The plaintiff dentists need the services of the technicians to properly provide for their patients. Were the technicians not concentrated in the manufacturer's plant (Brand Company), each plaintiff would employ one or more technicians as a part of his office staff and the machinery required to produce dentures would be among his equipment. For purposes of economy and efficiency (plaintiffs say "to conserve time"), plaintiffs accept the services and accommodations of Brand Company. The mere physical disassociation of the manufacturing of dentures from plaintiffs' offices will not exclude plaintiffs from the "industry, trade, craft or occupation" which uses those dentures for profit. The manufacturing forms an integral part of the dental business. Such removal would work no change of relationship of the dentists to the technicians who collaborate with them closely in the process of providing dentures for plaintiffs' patients.

If there is a unity of interest between user and manufacturer, the workers who make the product may picket the user's premises, and disclose the fact that the manufacturer's plant is struck (Goldfinger v. Feintuch). In the above case, plaintiff, a delicatessen store owner, sold Kosher provisions which he purchased from a nonunion manufacturer. He was denied an injunction to restrain picketing for the reason that "unity of interest" existed.

In People v. Muller, the court found "unity of interest" where a haberdasher was picketed because he used on his store premises a "burglar alarm system" installed and maintained by the struck manufacturer. In the case at bar, the "unity of interest" is more pronounced than in those cases cited. The plaintiffs' offices are practically the sales department for Brand Co. Taking the impression of the patient's gums in his own office, the dentist passes that mold on to the manufacturer, who produces the denture. Back to the dentist's office goes the newly created denture for fitting in the patient's mouth. Back to the manufacturer again goes the denture for corrections and this shuttling is continued until the dentist is satisfied. It is as if Brand Co. were the backroom or work shop of the dentist's establishment and Brand's employees, the plaintiffs' helpers. Were they the plaintiffs' helpers, the work would be done no differently, excepting only the scene of their labors. Plaintiffs and the technicians are engaged in exactly the same occupation. Together they make dentures for particular persons. They are unlike the ordinary manufacturer who constructs for the user who tries to fit himself into the completed article with the aid, perhaps, of alterations. From its inception, each denture is expressly created for one person and eventually finds its way into the mouth of that particular individual. The reason the denture terminates there is because it serves the patient's needs exactly which is due to the combined handicraft of plaintiffs and the technicians, the work of one being indispensable to the work of the other in that combined effort. In this work, they are fellow tradesmen manufacturing dentures for particular persons. Each completed denture, which is accepted and used, is an accomplishment in concerted craftsmanship displayed by the plaintiffs and the technicians. It is the result which they hoped for when they essayed together to produce by their talents the exact denture required by the very person for whom it was fashioned. Their alliance in the manufacturing of the dentures is undetachable. Remove one and the effort fails. Is that not "unity of interest"?

It is of no significance that the plaintiffs fail to itemize in their bills the cost to the patient of the denture supplied. The way that plaintiffs and Brand Co. carry on their business establishes that "unity of interest" which serves to classify plaintiffs as persons engaged in the same "industry, trade, craft or occupation" with the technicians and their union. Hence this is a "labor dispute" and the complaint must be dismissed.

The court commented that it could not follow the opinion in the Back v. Kaufman case.

The decision of the lower court was completely reversed on appeal, the appellate court holding that the acts of the technicians' union in picketing the offices of the dentists who were not parties to an industrial dispute and in accosting their patients for the purpose of coercing the dentists to take sides in a controversy in which they had no interest, constituted a secondary boycott and an unlawful interference with the dentists. The appellate court cited Goldfinger v. Feintuch as a precedent.

Brennan v. Eisen

Another dental case, Brennan v. Eisen (69 N.Y.S. 2d 441), was decided a few days after the decision of the lower court in the Jacobs v. Eisen case but before the decision of the appellate court. In the Brennan v. Eisen case the union was picketing the offices of the dentists during a laboratory strike, and the dentists sought an injunction to stop the picketing.

The court said that it is unnecessary to review the relation of the dentist with his patient and with the laboratory which makes the dentures, since it has been determined that no relation of employer and employee nor of producer and consumer is involved and that picketing under the circumstances constitutes a secondary boycott. The case of Back v. Kaufman was cited as a precedent. The court noted that the union relied on the decision of the lower court in the Jacobs v. Eisen case, which took the contrary view, but observed that there was a completely different state of facts in this case.

The facts are that the union included

dental assistants and dental hygienists in its membership in addition to employees in dental laboratories. The union had sent notices to all of the dentists that it wished to organize the employees in their offices and to bargain collectively for them. Each of the dentists had declined to negotiate with the union, which claimed, therefore, that there is a labor dispute, regardless of the laboratory situation.

The court commented that the union would be correct in its position if it were acting in good faith. However, the evidence showed that the union had limited its campaign of organization to those dentists who obtained their dentures from the laboratory with which it was having its dispute. It made the request of and picketed these dentists whether they had any employees or not. Many had none. Of those that did, in some instances the sole employee was a receptionist, an occupation which the union had not hitherto sought to include in its membership. The union claimed that its action was not a subterfuge, but the court observed that the facts said otherwise and granted an injunction to the dentists.—*George H. Fox, Secretary.*

RESEARCH COMMISSION

ADDITIONS TO LIST OF CERTIFIED DENTAL MATERIALS

SAMPLES of materials recently certified by the manufacturer as complying with the respective specifications of the American Dental Association were tested by the American Dental Association research fellowship at the National Bureau of Standards under the supervision of that bureau. The following materials were found to comply with the specifications and should be added to those listed on page 1458 of the November 1, 1946 issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (for the amalgam alloys) and on page 526 of the October 1, 1947 issue of THE JOURNAL (for the denture resins).

Certified Amalgam Alloys (A.D.A. Specification No. 1)

Alloy	Manufacturer or Distributor
Precision	Precision Bur Company
Stratco	Edward P. Stratt

Certified Denture Resins (A.D.A. Specification No. 12)

Material	Form	Manufacturer or Distributor
Denture Acrylic	Pink; powder-liquid	The S. S. White Dental Mfg. Co.

CASES AND COMMENTS

Costen's Syndrome: A Report of Two Cases.

By L. G. Parry, D.D.S., East Point, Ga.

Costen's syndrome is a term used to denote the symptoms associated with dysfunction of the temporomandibular joint when that dysfunction is the result of loss of molar support or absence of occlusal balance.

The syndrome shows itself in a number of ways. Disturbances of the ear associated with the dysfunction of the joint are "dependent upon the actual involvement of the eustachian tube and tympanic structures."[1] The loss of molar support or the absence of occlusal balance with the consequent loss of vertical dimension causes a relaxation of the soft tissues in which the eustachian tube is invested. The involvement of the tympanic structures depends on the intrusion of the condylar head on the tympanic portion of the glenoid fossa. Correction of dental occlusion or institution of molar support will correct the position of the head of the condyle and establish its proper position in the glenoid fossa.

The relaxation of the soft tissues investing the tube (the tensor palatine muscle and the upper head of the external pterygoid muscle) causes an occlusion of the tube, with the classic symptom of tinnitus or stuffiness of the ears. The chief result of tinnitus is dizziness. The condition can be corrected temporarily by inflation of the tube, but final correction cannot be made until the soft tissues surrounding the tube have been returned to their normal state of tension.

The other symptoms of the dysfunction are trismus,[2] glossodynia,[3] neuralgia and reflex effects. The cause of glossodynia (burning of the tongue), in the presence of a closed bite, can be traced to irritation of the chorda tympani nerve by the malposition of the head of the condyle, as the nerve makes its way through the petrotympanic suture of the glenoid fossa.

Pain is the most spectacular indication of the syndrome. Loss of molar support influences the smooth natural excursion of the lower jaw and gives the first diagnostic indication of the origin of the pain.[4] Irritation of the auriculotemporal nerve, as the nerve passes mesially to the capsule and between the tympanic plate and the condyle, is not an uncommon symptom. This irritation causes pain in the ear, the parotid region, the temporal region, the zygomatic region and sometimes forward into the lower jaw. A diagnosis of trigeminal neuralgia is often erroneously made. The following report of a case is a typical example of the reflex effects of the syndrome.

Case 1

The patient, a white woman, aged 50, was referred by an oral surgeon. Her chief complaint was recurrent sharp pain in the right ear, the right side of the face and the temporal region. There was no tinnitus. She complained of a burning sensation in the involved areas when pain was not present. She displayed an extreme nervousness, bordering on neurosis.

About two years previously, the patient had had a sudden attack of excruciating pain in the temporomandibular region on the right side. A general medical practitioner was called, who finally referred her to a neurosurgeon, and a diagnosis of trigeminal neuralgia was made. A rhizotomy was performed, but no permanent relief from the spasms occurred. The patient later sought the advice of an otolaryngologist, and he, in consultation with an oral surgeon, and after a detailed roentgenographic study, diagnosed her illness as a disturbance of the temporomandibular joint, namely, Costen's syndrome.

The patient was wearing ill fitting dentures, had a marked closed bite and displayed decided loss of vertical dimension. The roentgenograms showed an intimate articulation of the condyle head with the tympanum. The intrusion of the head of the condyle into the tympanum could be felt by placing the little finger in the ear while the patient closed the jaw. The patient was referred to me for new dentures. In making the mandibular impres-

1. Costen, J. B., A Syndrome of Ear and Sinus Symptoms Dependent Upon Disturbed Function of the Temporo-Mandibular Joint. *Ann. Otol., Rhin. & Laryng.* 43:1 (March) 1943.

2. Costen, J. B., The Mechanism of Trismus and Its Occurrence in Mandibular Joint Dysfunction. *Ann. Otol., Rhin. & Laryng.* 48:499 (June) 1939.

3. Costen, J. B., Glossodynia: Reflex Irritation From the Mandibular Joint as the Principal Etiologic Factor. *Arch. Otolaryng.* 22:554 (November) 1934.

4. Costen, J. B., Reflex Effects Produced by Abnormal Movement of the Lower Jaw. *Arch. Otolaryng.* 36:548 (October) 1942.

sion I exercised great care, as the slightest backward pressure in the lower right side of the jaw caused a spasm.

With the new restorations the patient's vertical dimension was increased 7 mm. From an esthetic point of view and in regard to facial balance, this increase was not enough. As will be pointed out later, this insufficient increase has had, in my opinion, definite pathologic repercussions.

The new dentures were inserted, and the patient experienced immediate relief from the spasms. Within three days there was complete relief from the burning sensation. This spectacular result has not been general with other patients I have treated who were suffering from similar disturbances.

Eight months have elapsed since the dentures were first inserted. The patient has returned every three weeks for examination. There has been no recurrence of the sharp pains. The general nervousness disappeared within a short time, and the patient has been comfortable.

At the patient's last visit it was noticed that a slight closure of the vertical dimension is taking place, and the patient revealed that a spasmodic burning sensation is recurring in the right side of the face and the temporal region. There have been no other recurrences of pain. The closure may be caused by a resorption of the ridges. It is problematical whether this relatively rapid resorption and closure resulted from failure to establish the full esthetic and physiologic vertical dimension. Schweitzer,[5] in his studies of mouth reconstruction with both natural and artificial dentitions, demonstrated in a series of cases that a certain amount of closure takes place over a period of eight to ten years. The increased dimension may be accomplished by a series of dentures, the dimension being increased in each denture. It is possible and probably advisable in most cases to make the full increase with the initial set of dentures.[6] The increase in vertical dimension in this case has brought the head of the condyle downward and forward to its normal position in the fossa. It is interesting to note that after eight months the patient finds it almost impossible to occlude her old dentures in the mouth.

5. Schweitzer, Jerome, Restorative Dentistry. Ed. 1. St. Louis: C. V. Mosby Co., 1947, pp. 246-254.

6. Block, L. S., Diagnosis and Treatment of the Temporomandibular Joint Especially in Relation to Vertical Dimension. *J.A.D.A.* 34:253 (February 15) 1947.

Case 2

The following report of a case is indicative of the disturbances of the ear and the neuralgic symptoms associated with dysfunction of the temporomandibular joint.

The patient, a man, aged 48, was referred to me by a general medical practitioner for examination to determine foci of infection of dental origin. His chief complaints were stuffiness of the ears, dizziness, faulty vision, daily headaches in the region of the vertex and continual pain in the suboccipital region. He experienced no pain in the region of the temporomandibular joint.

The patient reported that the first symptom to appear was "closing of the ears," in 1931, with headaches following shortly thereafter. In the intervening fourteen years the condition slowly became more severe. The patient had received various types of treatment but had obtained no relief.

All posterior teeth were absent except the upper right second molar and the lower left third molar. These teeth were later extracted. The anterior teeth showed marked abrasion with a decided overbite. Bilateral roentgenographic examination showed that the temporomandibular joint was normal. A mild intrusion of the head of the condyle into the tympanum could be felt by digital examination. The patient was apprehensive and nervous.

Partial dentures were constructed. The vertical dimension was increased sufficiently to relieve the overbite on the anterior teeth. On the upper denture a splint was extended from the palate to cover the lingual surfaces of the anterior teeth. The proper incisal guide table was traced on wax on the splint from the lower anterior teeth by having the patient register protrusive excursions of the mandible. The guide was then processed in acrylic resin onto the upper denture.

The patient experienced difficulty for about two weeks in accommodating himself to the increased opening. After two weeks the tinnitus disappeared, and relief from the dizziness followed. After the first month the patient reported that there was great improvement in his general nervous condition and that the headaches were becoming less severe. After two months the headache in the vertex region had disappeared completely and the patient

expressed himself as enjoying a relaxed state of well being. The pains in the suboccipital region were still present but much less severe and after three months they disappeared.

It has been observed in the two cases cited in this paper, and in many other patients who have been edentulous over a long period of time, that the gothic arch tracings form a flat more or less obtuse angle. For patients who have not been edentulous for such a long time the tracings form a sharper angle. I have no scientific explanation for this phenomenon but it seems possible that the erosion of the meniscus and the bony portions of the temporomandibular articulation prohibits the sharper lateral excursions that are demonstrated in patients who have been edentulous a short period of time.

Conclusion

1. Costen's syndrome is caused by the intrusion of the head of the condyle into the glenoid fossa.

2. The syndrome may manifest itself in a number of ways: by disturbances of the ear resulting in tinnitus, dizziness and loss of hearing on rare occasions; by neuralgic disturbances caused by irritation of the auriculotemporal nerve; by trismus, and by glossodynia caused by irritation of the chorda tympani nerve.

3. The radiation of the pain in the face can be traced by the nerve supply, as the auriculotemporal nerve anastomoses with the facial nerve at the posterior border of the masseter muscle.[7]

4. Absence of molar support or lack of occlusal balance are the causes.

5. Construction of dentures to restore molar support, full vertical dimension and balanced occlusion may correct the disturbance. For patients who have their teeth, occlusal splints are indicated.

Removal of a Tooth From the Tongue: Report of Case.

By Israel Harrison, D.D.S., Philadelphia.

On September 18, 1944, a woman, aged 45, visited a physician to determine the cause of a foul discharge from the tongue. The patient disclosed that she had received a gunshot or bullet wound in 1933. The shot had entered the left cheek, had dislodged both lower left bicuspids, had passed through the tongue and had made its exit through the floor of the mouth on the right side. The patient had been taken to a hospital and given transfusions, and the wounds had been sutured.

Fig. 1.—Roentgenogram of bicuspid region

It has been impossible to learn the type of weapon or shot used. The patient's only statement was: "We were all deer hunting, and a rifle was discharged accidentally."

On September 19, 1944, the patient was referred to me by the physician for roentgenographic study to find the suspected foreign body in the tongue. A roentgenogram of the left bicuspid region (Fig. 1) shows a body resembling a needle point about 2 mm. in length. A roentgenogram of the tongue (Fig. 2) shows that the crown of a bicuspid and a foreign body resembling a section of a needle were in the tongue.

On September 20, with the patient under

Fig. 2.—Roentgenogram of tongue

7. Shapiro, H. H., *Applied Anatomy of the Head and Neck*. Ed. 2. Philadelphia: J. B. Lippincott, 1947, p. 195.

procaine anesthesia, the metallic object was removed from the bicuspid region. It was found to have disintegrated and on removal was identified as part of the shot. Nothing further was done because of the indisposition of the patient.

On November 1, 1944, the patient complained of arthritis, and the physician insisted on clearing up the tongue condition. There was much discussion regarding the place of operation, the anesthesia to be used and whether the physician or a dentist should perform the operation.

On January 25, 1945, the patient, on her way to discuss the case with another physician, stopped in my office to review her dental condition and suddenly decided to have the operation performed immediately.

A mandibular injection of procaine was administered. When anesthesia of the tongue and the lip was evident, procaine was injected directly into the tongue, anterior and posterior to the fistula. A suture was passed through the anterior part of the tongue to act as a protractor. An incision was made at the outer border of the tongue, in the region of the fistula, just large enough to allow for the insertion of a hemostat. The beaks were carefully opened to dilate the fistula. Finally a curet was introduced and the tooth was removed. One suture was enough to close the incision.

It was decided to disregard the small object which originally resembled a needle point, since dissection for it would have involved too much tissue. I had already decided that the object was part of the shot and was not within the area from which exudate was coming. The patient was dismissed at 1:30 p.m. and at 5 p.m. was able to eat her dinner with little discomfort.

By January 27, 1945, there was apparent healing, and no exudate was evident. The arthritis was less severe.

On February 16 the tongue was completely healed and the arthritis had disappeared.

On August 29, 1947, there had been no recurrence of the arthritic condition and the fistula was gone.—*605 Medical Arts Building.*

Interchange of Licenses Between States

To the Editor: In the January 31, 1947, issue of the *New York Sun*, I read an article entitled "Concentrated Dentistry," written by Dr. L. F. White, of New York.

In this article Dr. White states that there is a shortage of dentists in the Southern and Southwestern states. I agree with his opinion that the cause of the shortage is the fact that there is no interchange of licenses between the states; hence dentists are prevented from migrating from one state to another. That is the reason why there are twenty dentists in the one square block in which Dr. White is practicing. Not all of these dentists are boasting of success, and there is no doubt that some of the twenty dentists would migrate to other states if there were an interchange of licenses between states. I am sure that most of these dentists were graduated from reputable colleges and are proficient and competent practitioners. However, they probably could not pass an examination on dental theory, although most of them could easily pass a practical examination.

I urge every member of the dental profession to write a letter to his congressman and senator urging them to pass a federal law which will allow a registered and licensed dentist to practice anywhere in the United States.—*B. Mindling, D.D.S., Essex House, Central Park South, New York 19.*

A Technic Using Modeling Compound for Refinishing Dentures.

James J. MacMillan, D.D.S., Carbondale, Pa.

Many dentures which have been worn for

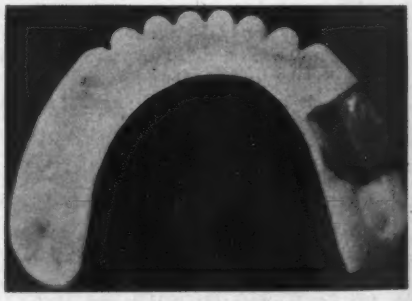


Fig. 1.—Lower denture with borders trimmed and undercuts removed. High fusing compound has been added on the left side to restore the occlusal contact with the upper denture

Fig. 2.—Addition of high fusing compound in the labial region

some time lose their original fit and occlusion because of tissue resorption. In many instances the making of new dentures involves a financial expense which may be a hardship to the patient. Such cases can oftentimes be handled at much less cost to the patient by a relining of the dentures, which restores the fit and the original occlusion.

The low fusing compounds have proved to be valuable in this work because (1) they can be heated with a hand torch in all regions, (2) they are not objectionable to the patient because of heat, (3) they are not distorted on removal from the mouth and (4) they can be reworked until the operator is satisfied that the border of the denture has been definitely established in all regions. The low fusing compounds can be heated with a hand torch and air cooled over high fusing compound without the heat's affecting the position and shape of the high fusing compound. Tempering the compound with water is unnecessary and should not be done because of the danger of distorting the high heat compound and the regions of the impression which have been completed.

This article deals with the restoration of a lower denture to a more useful condition. Similar methods may be used on upper dentures.

Figure 1 shows a lower denture which was made without a labial front so that it could be inserted immediately after the removal of the anterior teeth. The teeth, although they had been in good occlusion at the time of insertion of the denture, had lost good occlusal contact. In Figure 1 the borders of the denture have been trimmed and the undercuts have been removed. High fusing compound has been added on the left side to restore the occlusal contact with the upper denture.

As the next step high fusing compound was added in the labial region (Fig. 2). The high fusing compound was seared to the denture with a hot spatula. The compound may be tempered with water for shaping. High fusing compound was attached in the same manner in the heel region. If it was suspected that there was a shortage of denture material at any points on the border, these regions were restored by the addition of high fusing compound.

Figure 3 shows the completed impression. The acrylic material of the denture, the dark high fusing compound which forms the tray and the lighter colored low fusing compound used for the final impression can be seen. In Figure 3, right, the dark material in the sublingual region is a low fusing compound of a different color used to check the sublingual registration. Low fusing compounds of different colors are useful to check registrations in any region if doubt exists as to the accuracy of a registration.—*406 First National Bank Building.*

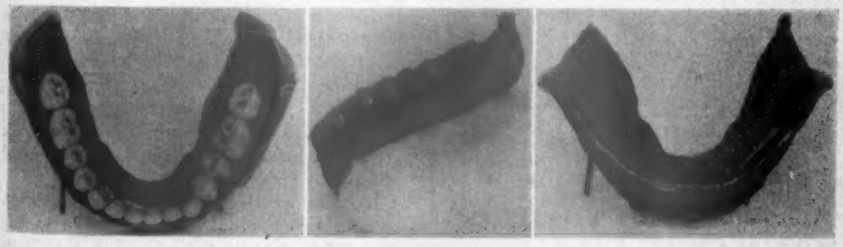


Fig. 3.—Completed impression

Blind Abscess on Left Side of Lower Jaw: Report of a Case. By Col. W. A. Rose, Dental Corps, Tacoma, Wash.

A man, aged 19, was admitted to the hospital with a swelling on the left side of the lower jaw (Figs. 1 and 2). The swelling was accompanied by severe pain. The patient's temperature was 100.5 F., and the pulse rate was increased.

The patient reported that the condition had been present for three weeks. On the basis of roentgenographic and clinical examination, a diagnosis of blind abscess, resulting from the remaining roots of a lower left first molar, was made.

After preoperative medication and the administration of a local anesthetic, a low horizontal incision was made extending the full length of the area. A large amount of rather thick pus exuded and was expressed from this and the surrounding region. Immediately thereafter the tissues collapsed to a nearly normal condition. After irrigation, a drain impregnated with bismuth, iodoform and petrolatum was inserted and the incision was sutured.

Fig. 1.—Appearance of patient on admission to hospital

Fig. 2.—Lateral view of patient before operation

Three days later the remaining roots of the first molar were removed.

The patient had an uneventful recovery and was discharged from the hospital on the tenth day.—*Madigan General Hospital.*

A New Field for Dentists. By Charles A. Levinson, D.M.D., Brookline, Mass.

The laws of many states have in recent years become very strict as to the manufacture and sale of food products. One result of this trend has been a tremendous increase in the number of food hazard claims. The manufacturers and vendors of food have found it necessary to employ dentists qualified to advise on the nature and extent of the alleged damages. Many professional men have had little opportunity or desire for experience in accident and court cases, but their interest should now increase since the work promises both greater financial return and added professional prestige.

It is the duty of the examining dentist to offer constructive criticism and advice to the companies with which he is associated. Such service would benefit everyone, for it would

tend to reduce company costs and thus lower the price of food.

After a person has presumably injured himself with a foreign substance found in food, he generally reports the alleged accident to the owner, manager or proprietor of the store or restaurant where he made the purchase. He may solicit legal aid, in which case his attorney will write immediately to the responsible individual of the store or restaurant or to the insurance company, if one is involved. Receipt of the alleged claim and its history as given by both the claimant and the receiver of the claim are sent to the claim department. When an attorney has not been engaged, the claimant usually makes his complaint to the person from whom he purchased the food, who will send the claim to the insurance company. A copy of the claim also goes to the claim department of the restaurant or store where the purchase has been made. Duplicates are made at the claim office, and acknowledgment of the receipt of notice of the claim is sent to the claimant or his attorney, with a statement that the matter will be carefully investigated. The claim department then sends a letter to the examining dentist, giving him as complete a history as possible of the alleged accident.

As soon as the manager of a restaurant or other food dispensary knows of an alleged injury, he will notify the examining dentist whose province will be to ascertain the true nature and extent of the harm done. The best time to see the claimant is immediately after the alleged accident. An exact analysis can be made then, and the amount of damages and costs can be determined accurately.

After the examining dentist has completed his examination of the claimant, he will submit a report, neatly typed on a sheet of white paper, in triplicate copies. The examining dentist retains one and mails the other two copies to the claim department. One of these is sent to the insurance company in the event that the case goes to trial. The following is an example of an examining dentist's report:

Report of Dr. W....G....
In Re: Mr. C....G....

vs.

J....Restaurant Company

Name of claimant: Mr. C....G....
Address: A. Street, Boston, Mass.
Age: Twenty-two.
Occupation: Clerk.
Date of accident: March 10, 1947 at noon.
History: Claimant says that on the above date he was eating some spaghetti at the J.... Restaurant located in Boston, Mass., and that while eating some, he bit onto a small pebble which he says he swallowed and, as a result, broke off the tooth stub from his upper left central incisor (No. 9 on chart), which retained a two-tooth bridge, consisting of a thimble crown on the upper left central incisor, Steele interchangeable facing (No. 10) and a lug rest on (No. 11). He says that this bridge was made five years ago at a cost of one hundred dollars. I saw the claimant immediately after the alleged time of the accident.

Date of examination: March 10, 1947.
Place: My office.
Examination: I found that the stub of the claimant's upper left central incisor had been fractured off and was resting on a thimble crown, which was part of an upper left two-tooth bridge. There were no signs of any lacerations to the claimant's mouth. The general condition of his mouth is fair.
Opinion: If and when the claimant bit down onto the alleged foreign body, there is a possibility that he may have incurred his alleged injury.
Date of report: March 11, 1947.

As the average layman employed in claim departments does not know much about dentistry, some sort of dental chart is necessary. It should be properly designed and marked and submitted with the written report.

Roentgenograms of the alleged injured area should be taken whenever possible.

When the examining dentist receives a claimant, he is only to examine him and obtain all necessary data that will give the claim department a good working knowledge of the case. He is not to do any dental work of a restorative nature without the consent of both the claimant and the claim department. This does not apply to emergency first aid, which must always be given to the claimant. If a tooth is fractured and the nerve is exposed, the ache must be stopped. Bleeding must be halted, if glass has cut the soft tissues of the mouth. These things are done without consulting the claim department. For all subsequent treatments, the claimant must be instructed to go to his own dentist, unless he has none, in which case, with his consent and the consent of the claim department, the

treatment can be completed by the examining dentist.

A dentist should not serve in the capacity of an attorney for the claimant, regardless of whether the case is honest or not. Too many times a claimant who has no attorney and for some reason does not wish to have one permits his dentist to try to settle the claim for the amount of the dental bill plus something to compensate himself for his alleged injuries. The Dental Board of Registration in every state should instigate legislation to prevent dentists from acting as attorneys in food hazard cases. The Massachusetts State Legislature took this matter up unsuccessfully in 1938, when a bill to prevent physicians and others from settling personal injury claims with insurance companies was defeated by the Senate after it had been approved by the House.—*16 Hamilton Road.*

Society Establishes Section on Veterans' Affairs and Military Dentistry

To the Editor: The First District Dental Society of New York has accomplished a noteworthy step toward solution of the needs of its veteran members by the establishment of a Veterans' Section. The dentist veteran, despite all his unique problems, cannot divorce himself from organized dentistry. On the one hand, he needs his own organization in order to explore fully the means of solution of his difficulties, and, on the other hand, he needs the opportunity to reassimilate himself within the ranks of his fellow dentists. A Veterans' Section provides the means for achieving both objectives.

In structure this section is the same as the other sections of the society. Its purposes are the solution of veterans' problems and the utilization of the experiences of the veterans for the benefit of the society and the country. The veterans are best qualified to evaluate and contribute to the scientific advances arising from the research and experiences of the military dentists in the past years. Close relations of many of its members with the Army and Navy Reserve Corps will enable the society to keep constantly abreast of new developments from those sources.

The veterans approach their society with vital and urgent needs, but they bring with them valuable and important talents which can be of immeasurable benefit to organized dentistry. In order to utilize these talents and to offer full assistance to veterans' needs, the formation of veterans' sections in all district dental societies would seem a logical step. Today, with thousands of veteran dentists embittered and disillusioned as a result of their relatively futile efforts, to date, to offer their services to the public and to their societies, it would seem a most necessary step.—*Louis J. Budner, D.D.S., 2271 Walton Avenue, New York 53.*

Fracture of Lower Left Central Incisor: Report of a Case. By F. B. Gardner, D.D.S., Scranton, Pa.

A man, aged 40, came in for treatment of a fractured lower left central incisor. He claimed that the tooth broke off when he bit into a piece of bread.

Upon taking a history of the case, I found that the patient had been hit on the chin by a baseball twenty-five years previously.

The accompanying roentgenogram shows internal resorption in the right central incisor. The tooth which was fractured was no doubt in the same condition.—*Medical Arts Building.*

Fracture of left central incisor and internal resorption in right central incisor

BOOK REVIEWS

Der Werkstoff in der zahnärztlichen Prothetik (Materials for Dental Prosthetics). By Arthur Demisch, Dr. med. dent. 189 pages, with 51 illustrations. Bern, Switzerland: Medizinischer Verlag Hans Huber, 1946.

This book is written primarily for dental technicians and students. Unfortunately the author is not familiar with papers and textbooks written on dental prosthetics in the United States. As a result, the coverage of the book is incomplete.

The chapter on synthetic resins for denture bases covers five pages and reads like the instructions of a manufacturer for the use of these materials; however, no mention is made of physical properties. Tensile strength, impact strength, hardness, warpage and water absorption are usually included in the American books on these materials but cannot be found here.

The properties of casting wax are covered in one page. The author states: "A casting wax should possess a certain elasticity because it cannot always be removed from the model without a slight give. In other words, the wax model must snap back into its original form without distortion." Such a statement sounds like wishful thinking since distortion of the wax pattern and elasticity depend a lot on the manipulation of the wax. No mention is made of the stresses and strains introduced by manipulation.

This same criticism of not covering the available knowledge holds true for most of the chapters, with the possible exception of the chapter on gold. Here the microstructures of the various alloys and their relation to the physical properties of the metal are well discussed.

Four chapters deal with the laboratory aspect of the construction of full crowns, Richmond crowns, articulators and clasps and with the anatomic structure of the natural teeth. The elementary nature of the book can be judged by the translation of a paragraph describing the teeth: "The upper molars and four cusps are divided by grooves which look like an oblique H. The mesial cusps are somewhat more developed than the distal. The first molar is the largest. A ridge from the mesial palatal cusps up to the distal buccal cusp may break the groove. A characteristic small cusp is often found on the palatal side near the mesial cusp."—*H. A. Zander.*

Tomorrow's Food. By James Rorty and N. Philip Norman, M.D. 258 pages. Price $3.50. New York: Prentice-Hall, Inc., 1947.

This book is a broad and at times involved discussion of the food problem. The title is misleading in that only a few comments are made regarding food of tomorrow. Instead, the main subject as stated by the authors is that "this book tugs at the tangled strands of our food economy and culture and tries to show where they lead: to the chemistry and biology of the soil; to the ocean currents that so largely determine climate, seemingly banding the earth with measured belts of fertility and sterility; to the tiled and gleaming factories of our food processors; to the rat colonies of our biochemists and the clinics of our medical nutritionists; to the 45,000 test demonstration farms of the Tennessee Valley Authority and to the compost heaps of Sir Albert Howard; to the pioneer biologists of Peckham, England, and to the pressure group politics of Washington lobbyists, and to the 'creative psychiatry' of New York advertising men."

Certainly the subhead "The Coming Revolution in Nutrition" is quite unwarranted by the contents of the book. Section and chapter titles, too, are of the nature of newspaper headlines, seemingly created primarily to attract the attention of the reader. The general style is reportorial but of the sensational type in many instances, especially in regard to make-up and use of adjectives. Even so, much of the book will not be properly understood by the lay reader.

The book is divided into four sections: "The Quest For Health," a historical introduction; "What's Wrong With American Food?" a discussion of American food habits; "The Tools of Liberation," a discussion of methods for increasing the nutritive value of foodstuffs, and "The Consumer's Job—Putting the Tools to Work," a discussion of food planning and the role of cooperatives in food distribution and processing.

There are two appendixes. The first, by Norman, titled "How To Eat Sensibly Without Vitamin Charts," gives no clear instructions in its seven pages except references to another

book. The second appendix sets forth an excellent bibliography in an unusual form. Each item listed is summarized or evaluated briefly.

The authors state that their inquiry was labyrinthine, "since the dimensions of the food problem are not merely nutritional, but also economic, social, and political." In covering so broad a field, there is certain to be some confusion and tedious detail, in spite of division of material into sections. For the most part, trained nutritionists and scientists would agree with such general opinions as "even if we were to end poverty in America we would not thereby end malnutrition. We have also to correct our perverted food habits and underlying these, the distorted patterns of food production, food processing and food distribution which have developed." Not so readily accepted is the statement that "with respect to food, at least, we are being pushed willy-nilly into an economy of abundance. . . . Already while starvation hovers over Europe and much of Asia, we are having to deal with domestic food 'surpluses'."

The popular themes of organic soil fertilization and unorthodox methods of soil preparation as well as the implications of extension of the use of frozen foods are ably covered. The authors weigh the available data and do not permit emotional fervor to carry them afield. In the case of Faulkner's *Plowman's Folly* they state that, according to present evidence, it is most improbable that the general application of Faulkner's methods would multiply the present volume of agricultural production by five or ten, as he suggested in his book. In fact, there is substantial evidence to the contrary. They point out, too, that even though there are few adequate experiments to prove or disprove the importance of organic fertilizer versus inorganic, sole use of the organic form would require a disproportionate number of animals and thus is economically unfeasible. The authors bring attention to the far-reaching effects of expansion of locker plants and freezing units, not only in bringing about change in food habits but also in preventing waste.

Those sections dealing with agricultural, economic, social and political aspects appear to be better handled than those on the nutritional science. Critical and objective evaluations of data were not exercised in a number of instances. For example, in several chapters of the book, much emphasis is given to the supposed protection to teeth afforded residents of Deaf Smith County, Texas, by the high content of phosphorus in the soil, but no statement mentions the possibility that the fluorine content of soil or water might be a significant agent in the observed caries immunity. Again, too much weight and space is given to the observations of Weston A. Price. Rorty and Norman accept Price's conclusions, many of which are based on insufficient data. Not all geographic incidence rates of disease can be explained on a dietary basis. Varying susceptibilities, quite apart from diet, have been found in laboratory animals.

Although nutritionists and dentists will agree that the consumption of refined sugar has increased to unsafe quantities, still there is not agreement that "it has been proved that excessive sugar consumption is always a cause of dental caries."

In spite of some limitations, Rorty and Norman present a wealth of thought-provoking material, especially that concerned with the social and economic implications of the food problem.—*Dorothea F. Radusch.*

Medical Care and Costs in Relation to Family Income, A Statistical Source Book. Selected and compiled by Helen Hollingsworth, Margaret C. Klem and Anna Mae Baney. Second edition. Bureau Memorandum No. 51, Bureau of Research and Statistics, Social Security Administration. 359 pages. Price $1.25. Washington, D. C.: U.S. Government Printing Office, 1947.

Many persons connected with the health service field are at a loss when they find it necessary to seek out pertinent facts on socio-economic aspects of the medical care problem. This volume provides in ready reference form most of the basic data which even advanced researchers might need in filling out their background in this area. It is an enlarged edition of an earlier work, presenting an almost encyclopedic range of data selected from literature published during the last twenty years.

It consists of more than 300 statistical tables organized into the following seven sections: economic characteristics of the population; measurements of needs for medical (and dental) care; expenditures for medical care; health personnel; health facilities; voluntary hospital and medical care insurance, and state summaries.

The data on dentistry consist of thirty-five tables dealing with the distribution of personnel resources, population-dentist ratios, statistics on dental schools, dentists' incomes, patients seen, dental needs and costs per patient, and dental services and costs per patient. Additional data on other aspects of dental care are presented in tables dealing with other subjects. In general, the data are selected from reliable sources and are presented in readily usable and understandable form. One error was noted in table 220, based on the American Dental Association's study, *Dental Needs of Adults in the United States,* in which the heading refers to persons receiving specified dental services rather than to persons needing specified dental services, as stated in the original report.—*J. E. Bagdonas.*

Acrylics and Other Synthetic Resins Used in Dentistry. By Stanley D. Tylman, D.D.S., M.S., and Floyd A. Peyton, Ph.D. 480 pages, with 441 illustrations. Price $10. Philadelphia: J. B. Lippincott Company, 1946.

This book presents a complete picture of the status of acrylic resins as they are used in dentistry today. In Part I, Peyton has presented the subject from the standpoint of the engineer and physicist. He has drawn not only on the literature in the dental field but also on all of the important literature in other fields which has any bearing on the use of resins in dentistry. He exhibited excellent judgment in his selection of scientific papers, and he has shown remarkable critical acumen in abstracting the essential contributions of the various contributors to the literature and in integrating these abstracts into a logical discussion which is accurate, informative and even thrilling to the reader who is at all interested in this subject. The bibliographies which follow each chapter of the book are so complete that they in themselves are contributions to the literature.

Part I consists of six chapters which describe the history of dental resins, as well as the chemical and physical properties of all resins which are used in dentistry at the present time or have been used in the near past. Possibly the only weakness of this series of chapters is found in chapter 6, in which the author presents chemical and physical properties of some of the accessory materials for resin restorations. Probably because of a lack of space, these materials have not been dealt with as exhaustively as were the resins, and, therefore, the treatment leaves something to be desired. This chapter might well have been omitted and perhaps some information substituted on the subject of the elastomers and flexible resins which are later discussed by Tylman.

Part II, by Tylman, is a comprehensive discussion of the clinical applications of synthetic resins. This reviewer is not in a position to discuss critically the technics involved. Inasmuch as Tylman is a recognized author in this field, the reader can well assume that the treatment is accurate. There is repetition of some of Peyton's presentation but not to such an extent that the subject becomes monotonous. All of the recognized technics are discussed impartially and critically. The discussion includes the use of acrylic resin for operative, crown and bridge, partial denture and complete denture prosthesis.

The last four chapters are devoted to the subject of somatoprostheses, and this is probably the first time that this subject has been treated so completely in a single volume. These types of prostheses are constructed for the most part from what the author chooses to call "resilient resins." This term is somewhat unfortunate, inasmuch as these flexible resins may or may not be more resilient than the ordinary acrylic resins, for example, if the strict sense of the word "resilience" is adhered to. It would seem more accurate to call these resins by their technical name of "elastomers," or, if this term does not apply, they might better be called simply "flexible resins." This is, of course, a minor point of technicality, but oftentimes inaccurate terminology causes confusion in the literature as a whole.

This book should be in the library of every dental practitioner both as a textbook and reference work. It is hoped that the publishers will allow frequent revisions so that this excellent contribution may be kept up to date.—*E. W. Skinner.*

Maxillofacial Fractures: One Hundred and Fifty Seven Cases. Morris N. Young. Arch. Otolaryng. 45:668, June 1947.

The author described his experiences while with Army hospitals in Casablanca, Oran and Marseille, beginning in March 1943. In Casablanca, several fractures of the maxilla and mandible, an oromaxillary fistula following a dental extraction and depression deformities of the maxilla were seen. Interosseous wiring and pin fixation was limited to edentulous patients. The use of plaster head caps was quickly discarded. Fractures of the neck of the condyle were permitted to heal in the position of self-assumed realinement.

At Oran, 69 maxillofacial fractures were recorded. Of 29 cases of maxillary fracture, 7 involved the orbit. Two fractures included the zygomatic bone, 1 the infra-orbital region and 1 the anterior part of the maxilla. In 5 cases there were oromaxillary fistulas, of which 3 followed dental extractions. In 2 cases there were wounds which penetrated the antrum and in 1 a maxillofacial deformity and nasopalatine fistula.

In Marseille, many of the fractures were infected. German prisoners of war with fractures of the maxilla or mandible which had been treated by German methods were seen. These methods were regarded as clumsy, bulky and unnecessarily tortuous. Osteomyelitis was fairly common in these patients.

One paragraph concerning anesthesia is included. It states that in the management of patients with maxillofacial injuries the use of barbiturates for the induction of general anesthesia was forbidden by theater directive, since it was found to be hazardous to life.

A short treatment guide of general principles and procedures is included.—*W. G. Shafer.*

Dentigerous Cyst: A Case Report. Ralph W. Taylor and Raymond F. Huebsch. U. S. Nav. M. Bull. 47:696, July-August 1947.

A report is presented of the case of a patient who first was admitted to a U. S. Naval Hospital complaining of a foul discharge in the region of the mandibular left third molar.

Oral examination showed a fistula distal to the second molar from which an exudate could be evacuated on pressure. Palpation showed the lingual plate to be entirely destroyed. Roentgenologic examination disclosed an impacted third molar inferior to the roots of the second molar. A large radiolucent area joined the crown of the third molar, extending into the ramus nearly to the mandibular notch. The second molar responded positively to vitality tests.

A diagnosis of infected dentigerous cyst was made. Pentobarbital sodium grains 1½ was given preoperatively the morning of the operation and again one hour before the operation. Morphine sulfate grain ¼ with atropine sulfate grain 1/150 was given as necessary.

Operation was performed with the patient under conduction and infiltration anesthesia. After an adequate incision was made, the buccal plate over the second molar and cyst was removed and the second molar was extracted. The crown of the third molar was separated from the roots, and the pieces were removed with little difficulty. The cyst was enucleated en masse. Penicillin (20,000 Oxford units) with sulfanilamide in the form of dental cones was inserted in the bone cavity. Human thrombin and saline solution in fibrin foam was placed over this. The cavity then was filled with a dressing of loosely packed gauze impregnated with iodoform and was sutured.

The postoperative course was uneventful except for a paresthesia of the left side of the lower lip. This lasted about one month before sensation began to return.—*W. G. Shafer.*

Headache: the Teeth as a Source of Headache and Other Pain. Schuyler Robertson, Helen Goodell and Harold G. Wolff. Arch. Neurol. & Psychiat. 57:277, March 1947.

In this study an attempt was made to determine the distribution and mechanism of headache and pains in the face and neck resulting from noxious impulses originating in the teeth. Two electrical methods were used to produce pain in the teeth. One was the Hinsey-Geohegan stimulator with a step-down transformer; the other was the Vitalometer, often used for pulp testing.

When stimulating electrodes were placed on various teeth in the upper jaw, pain was ex-

perienced immediately in the tooth. This pain was accompanied by intense apprehension, salivation, lacrimation, flushing and generalized sweating. When stimulation was removed, pain in the tooth was terminated within five to ten minutes. After this a headache, reaching a maximum intensity within twenty to thirty minutes, was felt in the homolateral temporal region, along the zygomatic ridge and over the eye. The headache persisted from one to eight hours.

In the lower jaw, the same local responses were elicited after application of the same stimulation. Afterward pain extended throughout the upper and lower jaw into the region over the zygoma and the temple to the top of the ear.

Thus it is apparent that noxious impulses arising from the teeth in the maxillary arch result first in local pain and then in pain in tissues supplied by the second division of the fifth cranial nerve. Such impulses arising from the teeth in the mandibular arch cause pain locally and in tissues supplied by the third division of the fifth cranial nerve.

Studies on the pain threshold of the teeth also were conducted. It was found that the threshold varied widely in the same patient from tooth to tooth and even at various sites on a single tooth, depending on the thickness and intactness of the enamel. Variations on the same tooth were as great as 300 per cent.

It was found that when a tooth had been stimulated and the intensity of the resulting headache was at a maximum, the pain threshold of the stimulated tooth, which was no longer aching, was lowered 35 per cent. In other words, in a tooth with a lowered pain threshold, an ordinarily inadequate stimulus would become a noxious stimulus and give rise to pain.

Intracutaneous and intramuscular injection of procaine hydrochloride into the regions of temporal headache greatly reduced the intensity of the pain. The injection of Monocaine hydrochloride into the region about the stimulated tooth resulted in complete elimination of all pain in the head. In 1 patient the pain returned with the return of sensation to the gums. In 1 patient with trismus and a severe toothache and headache associated with osteomyelitis of the right side of the mandible, it was found that a block of the mandibular nerve produced by Monocaine hydrochloride instantly relieved all pain in the face. After several minutes the mouth could be opened with little discomfort. Headache remained in the back of the head and neck.

Clinically, it appeared that unless pain in the face or head is drastically reduced or eliminated by the injection of procaine hydrochloride about the tissues of the tooth in question, such a tooth, although seriously diseased, is not the cause of the headache. Migraine, atypical neuralgia and major trigeminal neuralgia never stem from dental disease.—*William G. Shafer.*

Osteomyelitis of the Jaw: Simulating Sarcoma, Myositis Ossificans and Actinomycosis. O. Jason Dixon. Ann. Otol., Rhin. & Laryng. 56:220, March 1947.

A case is reported of a high school boy who had a painful, swollen jaw and difficulty in opening the mouth. A history was given of a severe blow to the jaw the previous summer followed by pain for several weeks. After the injury, sulfanilamide had been administered and roentgenotherapy had been used. The onset of the recent swelling was mild with no high fever. There was a large, firm, nonsensitive mass at the angle of the lower jaw on the right.

The differential diagnosis suggested sarcoma, actinomycosis, osteomyelitis or myositis ossificans. Actinomycosis was considered because of the boy's habit of chewing grass. At the first biopsy, nothing could be shown because insufficient tissue had been removed. At a second operation, a large cavity was disclosed. Osteomyelitis was the diagnosis, and the patient was treated accordingly. It is believed that the massive doses of sulfonamides at the onset of the disease were the cause of the confusion of the typical clinical picture of osteomyelitis.—*W. G. Shafer.*

Open Reduction for Mandibular and Superior Maxillary Fractures. John C. Hampson. Mil. Surgeon 101:119, August 1947.

Open reduction of mandibular fractures was advocated by the author in the following cases: extensively comminuted fractures; fractures not comminuted but showing marked displacement of fragments; fractures with moderate displacement in which early reduction fails to bring teeth into satisfactory occlusion, and fractures with moderate displacement if the patient's condition precludes early

definitive treatment. The chief disadvantage to open reduction in these cases is the resulting linear scar.

If a sufficient number of natural teeth remain, multiple loop wiring and elastic traction are used for immobilization. If the patient is edentulous, the artificial dentures or a constructed splint are used. In most cases the immobilization period is forty-two to forty-five days.

Open reduction for superior maxillary fractures is indicated for fractures in which a crushing injury has impacted the outer wall of the maxillary sinus toward the inner wall and for fractures involving those portions of the superior maxilla which form parts of the inferior orbital rim, zygomatic process and nasal process. These fractures can be approached through the canine fossa and maxillary sinus by means of an intra-oral incision, thus leaving no scar.

Three illustrative case reports are given.—*William G. Shafer.*

Resistance to Streptomycin and Penicillin. Morton Klein. J. Bact. 53:463, April 1947.

The subjection of several strains of bacteria to streptomycin and penicillin has indicated that the development of resistant variants is not similar for the two antibiotics. The results indicate that variants originally showing or developing a high degree of resistance can be found in cultures assayed against streptomycin, but variants highly resistant to penicillin are not found. The rate of development of resistance to streptomycin by various bacteria is fairly rapid, but there is no broad range of bacteria resistant to penicillin and the rate of development of resistance is slow.—*G. W. Burnett.*

Intolerance to Common Drugs Administered for Asthma. John L. Morgan and Louis E. Prickman. Proc. Staff Meet., Mayo Clin., September 3, 1947, p. 391.

Observations on 17 consecutive patients who had asthma of sufficient severity to warrant hospitalization are reported. Twelve of the patients gave a history of previous abnormal reactions to drugs or had experienced such reactions while they were under treatment in the hospital. The authors concluded that, of the 12 patients, 5 were allergic to acetylsalicylic acid and 1 was allergic to iodized oil. Intolerance was observed to morphine sulfate in 4, bromide in 1, iodide in 4 and chloral in 1.

Those patients who were considered to be allergic to acetylsalicylic acid were not given additional doses of the drug in order to confirm the diagnosis of allergic sensitivity because of the violent character of their reactions. Extensive fungating moist lesions of the skin were noted in the patient who did not tolerate bromides.

The authors conclude: "Drug allergy and various types of intolerance to drugs are encountered rather frequently in the treatment of patients who have asthma. Patients who have asthma must be carefully questioned about previous reactions to drugs of any and all types and each asthmatic patient must be observed closely for early evidence of such intolerance. The use of the drug or drugs responsible must be meticulously avoided."—*Donald A. Wallace.*

Non-Hemophilic Hereditary Hemorrhagic Diathesis: Report of a Family of Bleeders. Louis Levy, II. Ann. Int. Med. 27:96 July 1947.

The report concerns a family of bleeders. Of 62 members of the family, 12 males and 8 females are affected. Both sexes have the bleeding tendency and both may transmit it. There is a tendency for the bleeding episodes to decrease with age. Minor degrees of trauma bring on prolonged bleeding. In 4 cases prolonged bleeding followed extraction of a tooth.

Five members of this family were studied. Coagulation time of whole blood and recalcified plasma after centrifugation, clot retraction, prothrombin time, platelet count, serum calcium and capillary resistance were within normal limits. Capillaries of the nail beds were in tortuous loops, and the blood cell columns failed to disappear after injury. Epistaxis and bleeding of the gums were common occurrences, as was prolonged bleeding after trauma. One of the children, at the age of 7 months, had cut the mouth and bled for twenty days. Menorrhagia which had lasted for ten to twenty-one days had occurred in others of the family.

Treatment was local: pressure and the application of fibrin foam. Transfusions had been given with questionable results.—*W. G. Shafer.*

LIST OF DENTAL OFFICERS

SEPARATED FROM ARMY DENTAL CORPS

THE following list of dental officers separated from the Army Dental Corps does not include rank because such information is no longer furnished by the Surgeon General's Office. Publication will be given to other names as soon as possible.

Arizona	
Tucson	Weiler, Earl D.
Tucson	Yohe, Perce P.
Arkansas	
Hughes	Billingslea, Eugene L.
North Little Rock	Adams, Ward A.
California	
Berkeley	Osibin, Harry A.
Capitola	Rohrbacher, Harry W.
Los Angeles	Ariaudo, Arnold A.
Los Angeles	Crapo, Willard D.
Los Angeles	DeCola, Charles E.
Los Angeles	Elston, Robert E.
Los Angeles	Leemon, Philip W.
Los Angeles	Segal, Seymour S.
Los Angeles	Shulman, Melvin
Marin	Sweet, Walter G.
Modesto	Miles, Ray M.
San Francisco	Susnow, Nathan A.
San Gabriel	Recordon, Lawrence G.
South Pasadena	Fetterman, Roy A.
Winters	Merchant, George E., Jr.
Connecticut	
East Haven	Kiernan, Harry D.
Greenwich	Rosenberg, Harold J.
New Haven	Weil, Albert M.
Stratford	Miller, John P., Jr.
Florida	
Inverness	Davis, William N.
Jacksonville	Simpson, Thomas B.
Miami	Wilson, Edwin C.
Illinois	
Chicago	Atterbury, Robert A.
Chicago	Krummel, Herbert H.
Chicago	Rosenberg, Elias S.
Chicago	Schwartz, William L.
Chicago	Stypinski, Chester T.
Glenview	Borrow, Bernard A.
Pekin	Brader, Robert E.
Indiana	
Indianapolis	Shafer, Russell F.
Iowa	
Clarksville	Fields, William H.
Monticello	York, Gordon A.
Parkersburg	Watson, Leo F.
Kansas	
Newton	Kurz, Karl F.
Kentucky	
Lexington	Kouns, John C.
Louisville	Smith, Louis T.
Maryland	
Chevy Chase	Smith, William G., Jr.
Hancock	Smith, Joseph H.
Massachusetts	
Pittsfield	Mack, Bernard
Roxbury	Iserovitz, David I.
Michigan	
Detroit	Ross, Robert E.
Detroit	Warren, Theodore S.
Grand Haven	Walley, Roman J.
Iron Mountain	Miller, Alfred E.
Minnesota	
Minneapolis	Ahnmark, Oscar P.
Missouri	
Nevada	Smith, Clovis W.
St. Louis	Ulrih, Paul A.
New Jersey	
Camden	Colalillo, Alexander A.
Passaic	Krulewitz, Donald
Union City	Schept, Chester
New York	
Bronx	Hinkley, Clayton M.
Brooklyn	DeChristoforo, Arthur
Brooklyn	Kroll, Louis
Brooklyn	Kronfeld, Sidney M.
Brooklyn	Pfeffer, Harry G.
Brooklyn	Rosenberg, Emanuel
Brooklyn	Sakett, Louis H.
Brooklyn	Semiloff, William
Brooklyn	Sigillo, Salvatore L.
Brooklyn	Singer, Leon E.
Brooklyn	Valdes, Caesar J.
Buffalo	Schwert, Kenneth E.
Flushing	Schmitt, Eugene
Larchmont	Frey, Marcy
Lockport	Scalzo, Anthony J.
New York	Becker, Ralph
New York	Levinsohn, Erwin
New York	O'Neil, Harold B.
New York	Rosenberg, Sidney

New York	Sabot, Albert I.	
New York	Schmidt, Arthur A.	
New York	Schneer, Richard M.	
New York	Shapiro, Bernard	
New York	Statman, Irving J.	
	North Carolina	
Battleboro	Smith, Herbert	
Weaverville	Roberts, Pearce, Jr.	
	Ohio	
Chillicothe	Scholl, Homer J.	
Columbus	Parks, Howard F.	
Crooksville	Bondy, Russell F.	
Dayton	Strader, Charles C., Jr.	
Ravenna	Peterson, Leroy W.	
Youngstown	Rinaldo, Samuel J.	
	Pennsylvania	
Altoona	Kusner, Herbert M.	
Easton	Ungerleider, Harry	
Palmyra	Brandt, Frederick O.	
Philadelphia	Baker, Herbert J.	
Philadelphia	Flocks, Louis M.	
Philadelphia	Udis, Edward L.	
	South Carolina	
Dillon	Simpson, Thomas R.	
Inman	McMillin, Clarence V.	
	Virginia	
Berryville	McAtee, Kenneth S.	
Front Royal	Van Deusen, Orville O.	
Richmond	Draffin, William C.	
	Washington	
Wapato	Hodgson, George H.	
	West Virginia	
Weston	Starcher, Sammy M.	

LIST OF DENTAL OFFICERS

SEPARATED FROM NAVY DENTAL CORPS

THE following naval dental officers have been separated from service, according to lists received from the Navy Department. These lists are not complete. Other names will be published as soon as possible.

	California	
Los Angeles	McMahan, William B.	Lieut.
San Francisco	Tilden, William F.	Lieut.
	Connecticut	
New London	McGuire, Roland B.	Lieut.
	Idaho	
Boise	Hanford, David W.	Lieut.
	Illinois	
West Frankfort	Woods, Earl A., Jr.	Lieut.
	Indiana	
Kokomo	Ricketts, Robert M.	Lieut.
	Maine	
Waterville	Pellerin, Lucian J.	Lieut.
	Massachusetts	
Watertown	Doyle, John P.	Lieut.
	Michigan	
Detroit	Daryaw, Russell J.	Lieut.
Detroit	Liefer, Saul G.	Lieut.
	Mississippi	
Meridian	Ackerman, Wm. J., Jr.	Lieut.
	New York	
Brooklyn	Gross, David J.	Lieut.
	North Carolina	
Belhaven	Hughes, Francis W.	Lt. Cmdr.
Charlotte	Graham, James E., Jr.	Lieut.
Mooresville	Brawley, Boyce A.	Lieut.
	North Dakota	
Burnstad	Ritter, Theodore C.	Lieut.
Edgeley	Heim, Alvin J.	Lieut.
	Ohio	
Delaware	Via, William F., Jr.	Lieut.
	Oregon	
La Grande	Palmer, Eugene A.	Lieut.
Portland	Hill, Ralph R.	Lieut.
	Tennessee	
Henderson	Parrish, Robert L.	Lieut.
	Texas	
Houston	Platt, Geston M.	Capt.
	Virginia	
Richmond	Way, Joseph H., III	Lieut.
	Washington	
Seattle	Houck, Arland M.	Cmdr.

DEATHS

Anderson, Arthur E., Peekskill, N. Y.; Pennsylvania College of Dental Surgery, 1906; died October 10; aged 64.

Anthony, George C., Greenbackville, Va.; Pennsylvania College of Dental Surgery, 1890; died September 10; aged 75.

Atkins, Malcolm W., Worcester, Mass.; Tufts College Dental School, 1923; died September 15; aged 52.

Bailey, Benjamin L. G., East Lansing, Mich.; died October 6.

Beggs, T. Milton, Holton, Kan.; Kansas City-Western Dental College, 1923; died September 23; aged 50.

Belton, Arthur J., Burlingame, Calif.; College of Dentistry, University of California, 1910; died September 23; aged 60.

Birkett, J. Harry, East Liverpool, Ohio; College of Dental Surgery, University of Michigan, 1912; died August 25; aged 62.

Bixby, Roy, Saline, Mich.; College of Dental Surgery, University of Michigan, 1917; died October 5; aged 66.

Brede, John W., Hamilton, Ohio; College of Dentistry, Ohio State University, 1929; died October 8; aged 41.

Bringhurst, Fred R., Alhambra, Calif.; died September 10.

Bronson, Almon E., Lincoln, Ill.; Dental School, Northwestern University, 1904; died September 18; aged 81.

Bryant, Henry L., St. Paul; Thomas W. Evans Museum and Dental Institute School of Dentistry, University of Pennsylvania, 1886; died September 30; aged 81.

Burgess, William H., Columbia, Mo.; died August 20; aged 77.

Cannon, Merle D., Waukomis, Okla.; Kansas City-Western Dental College, 1927; died September 3; aged 45.

Cappell, George W., Chicago; Chicago College of Dental Surgery, 1919; died October 4; aged 53.

Carlisle, Charles L., Park Rapids, Minn.; died September 18; aged 74.

Clark, Earl A., Astoria, Ill.; School of Dentistry, Washington University, 1926; died October 9; aged 48.

Cord, Lester J., Chestertown, N. Y.; Baltimore College of Dental Surgery, University of Maryland, 1906; died September 13.

Degenring, Adolph, Elizabeth, N. J.; Baltimore College of Dental Surgery of the University of Maryland, 1904; died September 6; aged 72.

Dienst, Carl, Aurora, Ill.; died October 5; aged 61.

Donahoe, Frederic F., Lowell, Mass.; Tufts College Dental School, 1918; died September 6.

Dougherty, Martin J., De Witt, Iowa; died September 21; aged 87.

Ellis, Edward G., Jefferson City, Mo.; School of Dentistry, Washington University, 1887; died September 8; aged 81.

Falvey, John F., Waukegan, Ill.; died October 12; aged 80.

Finney, C. C., Oshkosh, Wis.; died September 20; aged 78.

Freiot, John K., Washington, D. C.; School of Dentistry, University of Pennsylvania, 1899; died September 19; aged 69.

Gibson, William R., San Diego, Calif.; Dental School, Northwestern University, 1898; died September 19; aged 73.

Haines, Desway A., Orlando, Fla.; died September 21; aged 80.

Hiller, Paul W., Scarsdale, N. Y.; New York College of Dentistry, 1887; died October 5; aged 84.

Horn, Robert, Boston; Tufts College Dental School, 1905; died September 6; aged 70.

Hunter, J. P., Lufkin, Texas; died September 14; aged 79.

Ivey, Alexander, Estherville, Iowa; Chicago College of Dental Surgery, 1899; died September 24; aged 71.

Jacobson, Abraham H., Detroit; Chicago College of Dental Surgery, 1914; died October 6; aged 52.

Jelley, Frederick H., Buffalo; School of Dentistry, University of Buffalo, 1905; died September 28; aged 69.

Kennedy, Arthur M., Tidioute, Pa.; Pittsburgh Dental College, Western University of Pennsylvania, 1906; died September 14.

Kennedy, John J., Springfield, Mass.; Tufts Dental College, 1904; died September 5; aged 75.

Kramm, William, Peoria, Ill.; died September 18; aged 71.

Kunkle, Albert C., Erie, Pa.; Department of Dentistry, Medico-Chirurgical College of Philadelphia, 1905; died September 24; aged 64.

Lampman, Walter A., Hastings, Mich.; College of Dental Surgery, University of Michigan, 1895; died September 17; aged 78.

Lange, Henry F., Muscatine, Iowa; College of Dentistry, University of Iowa, 1903; died October 11; aged 65.

LaSalle, Clint W., Rochester, N. Y.; School of Dentistry, University of Buffalo, 1895; died October 8.

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Public Information: Herbert B. Bain, Director, 222 E. Superior St., Chicago.

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Full Denture Prosthesis: Homer Simpson, Medical Arts Bldg., Dallas, Texas.

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Hospital Dental Service: W. Harry Archer, Professional Bldg., Pittsburgh.

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Orthodontics: Frank W. Nash, Medical Arts Bldg., Scranton, Pa.

Partial Denture Prosthesis: A. O. Klaffenbach, 226 River St., Iowa City.

Periodontia: Harold J. Leonard, 745 Fifth Ave., New York.

Practice Management: Gaylord J. James, 9400 Euclid Ave., Cleveland.

Radiology: L. R. Main, 3556 Caroline St., St. Louis.

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ANNOUNCEMENTS

MEETINGS OF STATE SOCIETIES

State	Date	Place	Secretary	Address
Alabama	April 15–17, 1948	Birmingham	G. W. Matthews	1922 Tenth Ave., S., Birmingham 5
Arizona			B. K. Litt	68 E. Congress, Tucson
Arkansas	May 2–5, 1948	Little Rock	D. M. Hamm	Clarksville
California	April 26–28, 1948	San Francisco	L. E. Linehan	450 Sutter St., San Francisco
S. California	Mar. 29–31, 1948	Los Angeles	M. E. Ralston	903 Crenshaw Bldg., Los Angeles 6
Colorado			R. A. Downs	724 Republic Bldg., Denver 2
Connecticut			E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			J. Krygier	309 S. State St., Dover
D. of Columbia			K. H. Wood	202-1835 Eye St., N.W. Washington
Florida			J. I. Todd	433 St. James Bldg., Jacksonville
Georgia			J. M. Heard, Jr.	Persons Bldg., Macon
Hawaii			J. H. Dawe	P. O. Box 39, Honolulu 10
Idaho			R. Sutcliff	Twin Falls
Illinois			P. W. Clopper	623 Jefferson Bldg., Peoria 2
Indiana			E. E. Ewbank	Kingman
Iowa			A. N. Humiston	417 Higley Bldg., Cedar Rapids
Kansas			F. A. Richmond	1008 Huron Bldg., Kansas City
Kentucky	April 5–7, 1948	Louisville	J. L. Walker	640 Barbee Way, S., Louisville
Louisiana	April 8–10, 1948	Alexandria	J. S. Bernhard	407 Medical Arts Bldg., Shreveport
Maine			A. H. Garcelon	State House, Augusta
Maryland	May 3–5, 1948	Baltimore	J. H. Shackelford	706 Baltimore Life Bldg., Baltimore 1
Massachusetts	May 3–6, 1948	Boston	P. E. Adams	227 Commonwealth Ave., Boston 16
Michigan	April 12–14, 1948	Detroit	F. Wertheimer	Michigan Department of Health, Lansing
Minnesota	Feb. 23–25, 1948	St. Paul	L. M. Cruttenden	Lowry Medical Arts Bldg., St. Paul
Mississippi			F. C. Sneed	Osyka
Missouri	April 25–28, 1948	Jefferson City	C. W. Digges	Exchange National Bank Bldg., Columbia
Montana			C. S. Renouard	305 Phoenix Bldg., Butte
Nebraska			F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada			L. G. Jacob	505 Chestnut St., Reno
New Hampshire			F. E. Williams	814 Elm St., Manchester
New Jersey	April 20–23, 1948	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico			J. S. Eilar	First National Bank Bldg., Albuquerque
New York	May 10–13, 1948	Syracuse	C. A. Wilkie	1 Hanson Place, Brooklyn
North Carolina	April 26–28, 1948	Asheville	C. W. Sanders	Benson
North Dakota	May 9–12, 1948	Minot	A. L. Smeby	Northwood
Ohio			E. G. Jones	185 E. State St., Columbus
Oklahoma			E. W. Wise	Medical Arts Bldg., Tulsa
Oregon	Feb. 5–7, 1948	Portland	W. H. Hurley	407 Selling Bldg., Portland 5
Panama Canal Zone			T. W. Cagle	Box 243, Cocoli
Pennsylvania	May 11–13, 1948	Atlantic City, N. J.	E. R. Aston	421 Market St., Kingston
Philippine I.			G. A. Carreon	9 Broadway, Third St., N. Manila
Puerto Rico			R. Miranda	Box 747, Rio Piedras
Rhode Island			S. Ozarin	172 Thames St., Newport
South Carolina			J. R. Owings	201 E. North St., Greenville
South Dakota	May 9–11, 1948	Sioux Falls	E. W. Elmen	Sioux Falls
Tennessee	May 24–27, 1948	Memphis	E. J. Justis	Exchange Bldg., Memphis
Texas	April 12–15, 1948	Fort Worth	W. Ogle	313 Medical Arts Bldg., Dallas
Utah			S. Ballinger	1001 Tribune-Telegram Bldg., Salt Lake City
Vermont			J. A. Larrow	Middlebury
Virginia	April 12–14, 1948	Richmond	J. E. John	804 Medical Arts Bldg., Roanoke
Washington	Jan. 29–31, 1948	Seattle	F. J. Dingler	1502 Medical & Dental Bldg., Seattle 1
West Virginia	May 20–22, 1948	Clarksburg	C. J. Gavelda	Clarksburg
Wisconsin	March 30–April 1, 1948	Milwaukee	R. A. Mason	964 N. 27th St., Milwaukee
Wyoming			J. D. McNiff	208 Grand Ave., Laramie

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Arizona	April 1–4, 1948	Phoenix	R. K. Trueblood	25 N. Second Ave., Glendale
California	Feb. 9, 1948 June 14, 1948 July 26, 1948	San Francisco Los Angeles San Francisco	K. I. Nesbitt	Room 203, 515 Van Ness Ave., San Francisco 2
District of Columbia	Jan 5, 1948	Washington	H. A. Swanson	1726 Eye St., N.W., Washington
Kansas	Dec. 14–17	Kansas City	G. L. Teall	Box 71, Hiawatha
Michigan	Feb. 2, 1948	Ann Arbor	J. L. Champagne	502 David Whitney Bldg., Detroit 26
Minnesota	Jan. 5, 1948		E. E. Comartin	100 First Avenue Bldg., Rochester
Mississippi	June 15, 1948		M. B. Pearce	New Albany
North Carolina	June 28–July 1, 1948	Raleigh	F. O. Alford	1109 Liberty Life Bldg., Charlotte 2
North Dakota	Jan. 11–15, 1948	Fargo	W. J. Ford	Fargo
Oregon	Dec. 15–18	Portland	F. L. Utter	506 Pioneer Trust Bldg., Salem
Tennessee	Dec. 15–19	Memphis	J. J. Vaughn	1005 Medical Arts Bldg., Nashville 3
Wisconsin	Feb. 16–20, 1948	Milwaukee	S. F. Donovan	Tomah

OTHER MEETINGS

Name	Date	City	Secy. or Chm.	Address
Alpha Omega Fraternity, Fortieth Annual Meeting	Dec. 29–31	Palm Beach, Fla.	B. E. Gruber Secy.	147 W. 42nd St., New York 18
American Academy of Dental Medicine, Luncheon and Round Table Discussion	Dec. 7	New York	W. M. Greenhut Secy.	124 E. 84th St., New York 28
American Association for the Advancement of Science, Subsection on Dentistry	Dec. 28	Chicago	I. Schour Secy.	808 S. Wood St., Chicago
American Dental Society of Europe	July 27–30, 1948	London	K. C. Campbell Secy.	88 Portland Place, London, W. 1.
Chicago Dental Society	Feb. 9–12, 1948	Chicago	A. L. Brett Secy.	30 N. Michigan Ave., Chicago 2
Cincinnati Dental Society March Clinic Meeting and Children's Dental Health Day	March 14–16, 1948	Cincinnati	R. L. Holle	Doctors Bldg., Cincinnati 2
Denver Dental Association, Forty-First Annual Mid-Winter Meeting	Jan. 11–14, 1948	Denver	K. F. Grove Chm.	1325 E. 16th Ave., Denver
Greater New York Dental Meeting	Dec. 8–12	New York	K. N. Donally Publicity Chm.	Room 106A, Hotel Pennsylvania, New York
Greater Philadelphia Annual Meeting	Feb. 4–6, 1948	Philadelphia	R. Adams Secy.	501 Stock Exchange Bldg. 1411 Walnut St., Philadelphia 2
Midcontinent Dental Congress, Seventh Annual Meeting	Dec. 1–3	St. Louis	V. H. Frederich Secy.	Arcade Bldg., St. Louis
National Board of Dental Examiners	Dec. 1–2*		G. L. Teall Secy.	Box 71, Hiawatha, Kan.
Pan American Odontological Association, Eleventh Annual Dinner Meeting	Dec. 10	New York	R. H. Brodsky Secy.	14 East 81st St., New York 28
Third All India Dental Conference	Feb. 19–22, 1948	Bombay	H. D. Merchant Organizing Secy.	Reception Committee, All India Dental Conference, 1948, Sambava Chambers, Sir Phirozshah Mehta Road, Bombay 1

*Examinations will be held in schools where there are five or more candidates.

Name	Date	City	Secy. or Chm.	Address
Thomas P. Hinman Mid-Winter Clinic	March 21–23, 1948	Atlanta, Ga.	F. A. Daniel Gen. Chm.	1023 Doctors Bldg., Atlanta 3
Washington University Dental Alumni, Eighty-Second Annual Meeting	March 5–6, 1948	St. Louis	V. P. Thompson Secy.	234 W. Lockwood, Webster Groves 19

INTERNSHIPS, EXTERNSHIPS, RESIDENCIES AND FELLOWSHIPS

Boston City Hospital, Boston. Oral Surgeon-in-Chief, Stephen P. Mallett.

The Children's and Infants' Hospital (a Unit) of Boston. Address Paul K. Losch, 300 Longwood Ave., Boston.

The Children's Memorial Hospital, Chicago. Administrator, Mabel W. Binner, 707 Fullerton Ave., Chicago.

City Memorial Hospital, Winston-Salem, N. C. Superintendent, J. B. Whittington.

Columbia University, School of Dental and Oral Surgery. Associate Dean, Bion R. East, 630 W. 168th St., New York 32.

Delaware Hospital, Inc., Wilmington. Medical Director, Delaware Hospital, 501 W. Fourteenth St., Wilmington 13.

Eastman Dental Dispensary, Rochester, N. Y. Director, Basil G. Bibby.

Fellowships for Research and Graduate Work in the Dental Sciences, University of Rochester, Rochester, N. Y. Dean, George H. Whipple.

The Forsyth Dental Infirmary for Children. Director, Percy R. Howe, 140 The Fenway, Boston.

International Grenfell Association. Staff Selection Committee, 156 Fifth Ave., New York.

Jewish Sanitarium and Hospital for Chronic Diseases. Director, Leonard Kohn, Dental Division, E. Forty-Ninth St. and Rutland Road, Brooklyn 3, N. Y.

Joseph Samuels Dental Clinic of the Rhode Island Hospital, Providence.

New York Foundling, New York. Medical Director, Alfred J. Vignec, 175 E. Sixty-Eighth St., New York.

Notre Dame Bay Memorial Hospital, Twillingate, Newfoundland. Address John M. Konopka, 25 W. Independence St., Shamokin, Pa.

Richmond Freeman Memorial Clinic for Infants and Children, Dallas, Texas. Executive Director, Dora B. Foster, 3617 Maple Ave., Dallas.

University of California, College of Dentistry, San Francisco. Dean, W. C. Fleming, University of California, Medical Center, San Francisco.

University of Illinois, Graduate School. Fellowships for Research and Graduate Work. Secretary, Committee on Graduate Work in Medicine, Dentistry and Pharmacy, 1853 W. Polk St., Chicago 12.

University of Illinois, Research and Educational Hospital, Chicago. Supervisor of Hospital Dental Services, Maury Massler, University of Illinois, 808 S. Wood St., Chicago 12.

University of Oregon, Medical School and Hospitals, Portland. Administrator, Charles N. Holman, 3181 S.W. Marquam Hill Road, Portland.

Walter G. Zoller Memorial Dental Clinic, University of Chicago. Director, J. R. Blayney, 950 E. Fifty-Ninth St., Chicago 37.